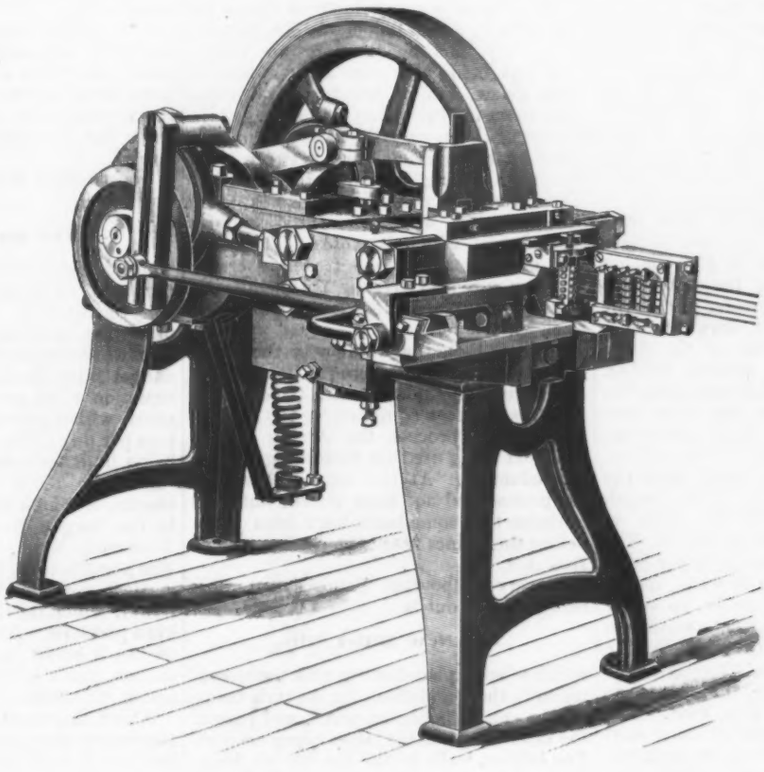
THE IRON AGE

THURSDAY, DECEMBER 17, 1891.

The Kennedy Wire-Nail Machine.

The accompanying engraving shows a newly perfected wire-nail machine for making five nails at each revolution, instead of one nail, as in the machine now used, thus making a large saving in cost of labor, as one man can attend to five of these machines as easily as he could to five of the one nail machines. The machine is small, compact, strong and durable, and very simple in construction. Three sizes of machines make all sizes of nails. The five wires are all fed through one feeding device and by one motion of the machine, and they are gripped by five pairs of dies, held in one pair of holders, which are closed by a knuckle-joint operated from a cam on the shaft of the machine, giving a very powerful grip and holding the wires very firm while being headed. The cutters consist of five pair of cutters adjustable independent of each other, but held firmly in one pair of holders that are operated by a slide seen on each side of the machine, in connection with an eccentric, causing them to work positively, in both the forward and backward motions. When dull these cutters can be taken out and replaced by new ones, not stopping the machine more than three minutes to make the change. The heading is done by a series of punches held in one holder, which works in a firm slide and is operated by a pitman from a crank on the shaft of the machine. It will be observed that while this machine produces five nails at each revolution of the shaft, it has no more motions than a machine that produces but one nail at a revolution of the shaft. This permits the running of the machine at a low rate of speed and there is, therefore, no heating of the working parts, and wear is reduced. The small size weighs about 1500 pounds, and makes all sizes, from fourpenny down to the smallest nails used, producing over 1000 nails per minute. The second size weighs about 3000 pounds and makes all sizes from fourpenny to twelvepenny, and produces over 750 nails per minute, or 4500 pounds of tenpenny nails in ten hours running time. The largest size weighs about 6000 pounds, and makes all sizes from twelvepenny to sixty-penny, and produces over 300 nails per minute.



THE KENNEDY WIRE-NAIL MACHINE.

The machine is the invention of John T. Kennedy, and is owned by the Kennedy Wire-Nail Machine Company of 175 Dearborn street, Chicago, Ill.

The Walter Wood Harvester Company of Hoosick Falls, N. Y., have decided to establish a western factory in St. Paul, Minn., and a local company with $2,500,000 capital have been organized to build the new works here. The new factory will supply the country west of Ohio, and will employ 200 men.

Progress of Naval Construction.

Commodore Theodore Wilson, Chief of the Bureau of Construction, has made his annual report, in which much space is devoted to a description of the progress made during the year upon the new vessels now building. The report says:

"Sixty-one per cent. of the work upon the armored cruiser Maine was completed October 1 last; satisfactory progress has been made with the coast-line battle ships Massachusetts, Indiana and Oregon, the most important of any yet undertaken by the Government. The contract made for the construction of Torpedo Boat No. 2 with the Iowa Iron Works indicates the possibility of building these valuable craft at safe inland points. Contracts have already been made for 11,210 tons of the 15,945 tons of armor required for the vessels now building. All the armored vessels being built at navy yards are practically ready for the armor, and the necessary plans for the armor of those vessels now building under contract are being prepared as rapidly as the hull construction advances.

"With the advent of modern steam vessels comes a pressing necessity for a large increase in the machine departments of the navy yards to make the unavoidable repairs, if they are to be expeditiously and economically made. To this end appropriations are recommended as follows: $25,000 for the Portsmouth (N. H.) Navy Yard, $150,000 for the New York Navy Yard, $44,000 for the League Island (Penn.) Navy Yard, $48,000 for the Norfolk (Va.) Navy Yard, and $100,000 for the Mare Island (Cal.) Navy Yard."

Seizing the opportunity afforded by the unfortunate experience of our steel cruisers in Chilian waters, the report treats at length of the necessity for sheathing the bottoms of steel vessels. It says:

"The importance of the preservation of the bottoms of steel vessels from corrosion and fouling can hardly be overestimated and is continually emphasized by the reports of loss of speed and increased consumption of coal received from our new unsheathed steel vessels now in commission. Unless we are willing to admit that the role of our cruisers in time of war shall be entirely confined to cruises of short duration, in the neighborhood of our own ports, it would appear that they are deficient in a most important quality—namely, the ability to maintain high speed at sea for long periods of time. All cruising vessels intended for general service in foreign waters should be sheathed if above 1000 tons displacement. Vessels of less than 1000 tons displacement, intended for general service as cruising gunboats, &c., should be of composite construction—viz., with steel framing, wood inside, planking and copper sheathing. The bureau desires to express its satisfaction with the progress of the work of building up a navy suited to the needs of the United States. When the vessels now under construction are completed, the country will possess the nucleus of a modern fleet, complete in all of its types, from the most powerful armored battleships to sea-going torpedo boats. These vessels, designed with special reference to the needs of our own naval service and to fulfill requirements of construction as severe as those of any nation in the world, will be, ship for ship, superior to most and second to none, of the vessels of any foreign fleet now built or building. It only remains for Congress to decide what number of each class are necessary for the protection of the country."

Only 12 of the old wooden war ships are now available for cruising purposes.

The discouraging statement was recently made by Captain Ambrose Snow in the New York Chamber of Commerce, that of 71 chartered ships in the harbor of San Francisco at that time, but five carried the American flag, and that the condition was still worse on the Atlantic. At the present time, he said, "there is not a single ship carrying the American flag loading for Europe at any port between Galveston and Maine, and there are 485 foreign vessels loading in these ports."

Improvements at Cambria and Gautier.

Like all great and successful steel works in the country, the Cambria Iron Company, at Johnstown, are constantly adding to and modifying their equipment, to meet the ever changing trade conditions and to keep abreast of modern rapid progress. A representative of *The Iron Age* visited the two great plants of the company recently. At

The Cambria Works

the conditions affecting extension and modification of plant are particularly intricate, because the available room is crowded even now with plant. To this must be added the fact that the whole transportation system of the works has had an additional burden thrown upon it by the exhaustion of the supply of natural gas and the enforced return to coal as the fuel. This involved the distribution to the different boiler and producer plants of close upon 1000 tons of coal per day and the disposal of the ashes. It must be considered that this came upon a system which must handle the raw materials for the production of over 1000 tons of Bessemer ingots, and for a considerable quantity of open-hearth, must take care of the removal of intermediate products, like ingots, blooms and billets, from mill to mill, and must provide for the stocking of a part of the product and the shipping of partly finished and finished goods. The first step being taken to relieve the surface tracks is the distribution of the coal on elevated tracks, a part of the work now being completed. The greater part of the coal used in the plant is drawn from a mine on the opposite side of the river, which is crossed by a private bridge. Early in the year a rope haulage plant was completed, which brings the mine cars from the interior of the mine across the bridge to the tipple located at the works, the power house being located near the mouth of the mine. The total length of this haulage is 10,680 feet, with an auxiliary endless rope near the tipple. The maximum grade of the line is 3½ per cent. and the maximum curve 40 feet 3 inches radius. The trains are made up of 37 cars, carrying 80 tons, that maximum length of train being dictated by the length of the siding. The capacity of the plant is 950 tons a turn, the maximum reached thus far being 1161 tons. The coal is screened, the screenings being used for those boiler plants which are equipped with mechanical stokers. Both the Brightman and the Murphy stoker have been applied. The latter has been chosen for the new plant for the new billet mill, one of its principal points of advantage being that it leaves the front of the boilers accessible, so that the fire can be readily watched and adjusted. It is probable that ultimately all steam firing will be done automatically. An ingenious arrangement has been devised for tipping the mine cars at the point where the trestle runs along the boilers, the problem being to avoid the necessity of putting in an equipment of new cars. Above the trestle runs a chain supported by wooden rollers. This chain can be driven. A slender chain is hooked to the one end of the car, and the other to the overhead chain, which is then drawn in the direction in which the car is to be tipped. By dragging the car chain over the roller it is shortened, the one end of the car is lifted and its contents discharged between the tracks.

The most important work now progressing at Cambria is the building of

A New Bessemer Plant,

which is to take the place of the old plant and is substantially a duplication of the new plant completed a little more than a year since. The principal object in the construction of this plant is, for the present, to be able to make repairs in a more leisurely, effective and cheaper manner. Ultimately the construction of another set of blowing engines, with the improved Goode gear, will permit of a very large increase in production. The new plant, like the present one, will have two 11½-ton converters, but it will have the spiegel cupolas placed above the platform between the converters. The work of dismantling the old plant is now progressing. We may note in this connection that the present plant is producing about 1100 tons of ingots per day, and is working very smoothly. The best day's record thus far has been that of November 19, when 1339 tons of ingots were made, the best work being 6943 tons in 617 heats, the ingots running about 6500 pounds. A large proportion of this product was special steel. The best record of the blooming mill was 7551 tons of blooms, during the week ending November 15. The ingots, which are kept in an erect position, are hauled to the Hainsworth heating furnaces on an inclined plane by locomotives, the bloom traffic passing under this incline. During our visit a roof was being put over a new plant of ladle driers, ten of which are in place, with room for 16. They are arranged in groups of three, only the last group having four, a traversing table between each two rows taking the ladle to the drier. The latter are coke fired with a large orifice, against which the tilted ladle is pushed, and which it closes. The plant will be commanded by a traveling crane. We may note also that the bottom drying arrangents will be increased and remodeled at an early date.

There is little that is new in the open-hearth department, where the Pernot furnaces are doing good work. One of the furnaces has been equipped for the Adams-Blair direct process, the Archer oil gas producer being used for furnishing the gas for reduction. At the time of our visit the process had not been tested, but it is probable that some heats have been made before these lines reach the readers of *The Iron Age*.

A very important improvement now being carried out is

The New Billet Mill,

which is being placed in line with the blooming mill, the foundations for the train being in, the engine being in place, and part of the machinery for the tables being erected. The engine, built by the Southwark foundry, is a tandem compound, with 36 and 75 inch cylinders and 66-inch stroke, and is equipped with a 90-ton fly-wheel. The billet train is a 26-inch three high, with one berth of rolls at present. It will ultimately have two. As stated, it is in line with the blooming mill. Special arrangements are to be provided for delivering the blooms to cars when they are to be shipped as such. A carrier across the mill to the heating furnaces to be built will take the blooms to the furnaces when that is desirable. The charging apparatus is to be the same as that so successfully introduced in the rail bloom heating furnaces. These furnaces will be large enough to store two heats when required. Under ordinary circumstances, however, the sheared blooms are taken by a carrier 90 feet long to the billet-mill table. The billets themselves will be delivered by carrier outside the building. The steam will be furnished by a battery of Babcock & Wilcox boilers, 2000 horse-power, equipped with the Murphy stoker.

As illustrating the difficulties under which mill transportation is being carried on, we may state that there is now being built an elevated track, the posts being up, on which there will be driven rollers which will take the blooms from No. 1 blooming mill to the point where a crane will deliver them upon the driven rollers passing along the line of rail mill heating furnaces. The total length of this overhead delivery will be about 700 feet.

Another instance in which the desire for more room has led to special appliances is furnished by the putting in of two machines at the axle department to load axles into railroad cars, the machines in question being elevators. We may note in this connection that the axle shop has a capacity of 800 axles a week, and that the Coffin treatment, concerning which we have given full details, is in use.

The other departments of the works have undergone little change. It is worthy of note, however, that the Cambria Iron Company are now rolling channels and beams up to 10-inch. We may state also that we observed some splendid steel castings and forgings made by the company for their own use. By an arrangement with the town authorities, the Cambria Iron Company have acquired a triangular strip of land between the railroad and the river, the tongue resting on the famous stone bridge. The town authorities abandon a street running along the track, while the company put a wall along the river and build a street along it to the next cross street. Thus some needed room, which will probably be exclusively used for carrying stock, has been acquired.

Construction work is going on uninterruptedly at

The Gautier Plant,

which is destined to become an enormous producer of merchant and agricultural steel of all kinds. A very large amount of filling has been done, which brings the level of the works high above any possible danger from floods. The principal construction work now going on is a wire plant, which is to have a capacity of 25 tons per day. The foundations are now being built for a cleaning and wire-drawing house, 250 x 50 feet, to contain 64 blocks, of which 32 are now being put in by the Morgan Construction Company of Worcester, Mass., for drawing fence wire. The plant is to be driven by a Southwark vertical compound engine ot 500 horse-power, which for the first will only be run high pressure. An annealing house 75 x 66 feet is being built to contain five annealers, and a galvanizing plant 50 x 200 feet is to follow.

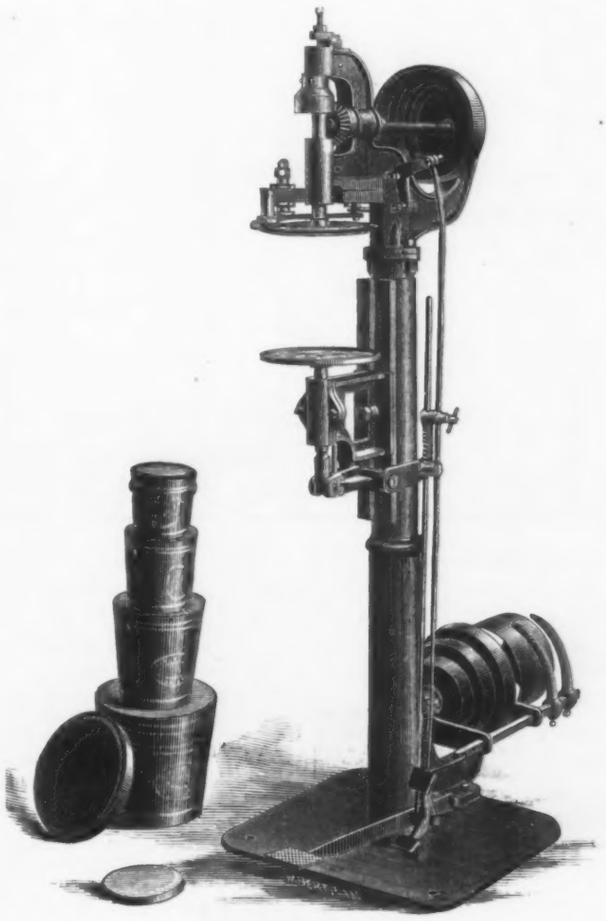
Above this plant a drop dam has been put across the Little Conemaugh River, forming a pool, from which an adjacent centrifugal pumping plant draws the water for condensation, while the feed water is put through a plant of Huyett filters. The steam plant consists of 1500 horse-power Babcock & Wilcox boilers, to which coal is delivered from a trestle, while the ashes are removed by a bucket elevator into cars. A fan for forced draft is provided but has not yet been used. The plant supplies

The New 10-Inch Mill,

admirably planned and but recently completed. In a speciul building is placed a plant of four Taylor gas producers. Above each of them is a coal hopper, into which the coal is delivered by an elevator, which conveys the coal from a hopper into which it has been dumped from the cars to a lateral distributing conveyor to the four hoppers, an arrangement which seems to be working well. The 10-inch mill is housed in a lofty, commodious building, 150 x 425 feet, there being room for another engine and train by adding another 75-foot span. The billets are heated in two Siemens heating furnaces. The train is driven by a tandem compound Southwark engine, by belts. The mill consists of one 18-inch roughing train and one 10 inch train, with

seven sets of rolls, and an inclined disappearing floor. The bars are delivered to a Baldwin stretcher, from which they go to a rotary cooling rack and straightener to the cooling beds. At the end of the mill is the shipping department, under the same roof. Between it and the mill is a depressed track, bringing the car level to the level of the mill. This depressed track is spanned by four drawbridges, so counterbalanced that they can easily be moved by hand. These drawbridges connect with the shipping department, at the end of which is another depressed track. Thus cars may be loaded either direct from the mill floor, for other departments, or from the shipping room, which can load on either side. For heating the mill the Sturtevant system has been adopted. We may note that excellent arrangements are provided in the mill in the way of dry closets, urinals, wash troughs and coat lockers.

The only change which has been made in the old mill already described in *The Iron Age* is that the room secured by the removal from it of the rake and finger bar machinery, to the new rake shop, will be utilized to extend the shafting department. Cold drawing machinery will be put in for the smaller sizes of shafting, while the facilities for producing the larger sizes will be enlarged by putting in a large shafting lathe, new straightening and new cutting-off machinery. The Cambria Iron Company will then be in a position to deliver the full line of shafting up to 4½ inches.



AUTOMATIC POWER CRIMPER.

may state that this mill has recently turned out 86 tons in one day.

Between the 10-inch mill and the next completed shop, space is reserved for a number of other buildings, the unit being the 75-foot space. We now come to

The Rake Shop,

which has just been completed and is now running regularly. It is 75 x 425 feet, top lighted like all the buildings, to provide for the emergency when the entire space will be covered. It is in this building that a large variety of agricultural shapes, rake teeth, finger bars, seat springs, &c., are made. The shop contains eleven furnaces, of which two are retort furnaces. They are both continuous and Siemens regeneration. Special arrangement is made to keep the oil used in the tempering tanks under a uniform head. The shop is filled with special machinery and tools. Among the latter we observed a multiple drill with 25 drills, designed at the works. We

It will be observed that the Cambria Iron Company are steadily progressing in the direction of a larger output, with improved equipment, and are developing on a broad and comprehensive basis a business in special steels, which the concentration of the rail business in specially equipped mills seems to indicate. A relatively moderate rail tonnage will be always retained, but it is evident that the company are steadily strengthening themselves in other directions.

Ex-Senator C. B. Farwell and a party of friends left Chicago on the 10th inst. on an important trip to Texas. Mr. Farwell and the party with him represent the Velasco (Texas) Channel and Dock Company and the Texas Immigration Company. The first day of last July the town of Velasco was laid out and it already has a population of 1500 according to Mr. Farwell. At that time also there was a depth of water of only 4½ feet. By the building of jetties the depth has been increased to 17½ feet, and 20 feet depth is looked for with the next rise of the Brazos River, which flows into the harbor. The jetties were built by the Dock and Channel Company at a cost of $1,500,000 without any aid from the Government. It is expected that with the improvements projected the depth of the river and harbor will eventually reach 30 feet, and that in the time to come Velasco will outrival New Orleans in population and in importance as a port. The improvements are being made by the company under a charter from the United States Government. A line of railroad—which will be 40 miles long—is proposed to connect the new town with Galveston, and also a line 20 miles in length to join the Texas International Railroad, An aggregate of the lots sold since July 1 of this year amounted fo $715,000. It is estimated that grain from Wichita, Kan., can be shipped at a third of the cost that it would take to put it on board ships at New York.

The Tinned-Plate Manufacturers' Association.

Acting-Secretary Clarence R. Britton, 64 Hoyt avenue, Cleveland, Ohio, has issued the following notice, under date of December 2, to the members of the Tinned-Plate Manufacturers' Association:

Owing to the time of year, when many companies are closing their yearly business, and consequently unable to get away, and as so few members of the association would be able to attend a meeting on December 9, the St. Louis Stamping Company have decided to postpone the "formal opening" of their "tin-plate department" until some time early next year.

The meeting of the association proposed for the 9th inst. has also been postponed until further notice.

The St. Louis Stamping Company desire to have stated, however, that should any of the members wish to see their works before the "formal opening" they are privileged to go there and see all they have in their tin-plate department.

Patent Automatic Power Crimper.

The illustration which we present herewith represents the No. 4 Patent Automatic Power Crimper, which is being manufactured by G. A. Crosby & Co., 176 to 178 South Clinton street, Chicago, Ill. The device is intended to crimp the tops or bottoms of round cans or pails on to the bodies, and is especially adapted, the manufacturers state, to crimp summer or false covers on to lard pails or other filled packages. The vessel to be crimped is placed on the chucks, and by the simple depression of the treadle shown in the illustration the can is centered, clamped between the chucks and crimped, all at the same operation. By this arrangement the manufacturers state the operator is allowed the constant use of both hands in handling the packages, which greatly facilitates the execution of the work. The machine weighs about 350 pounds and has a capacity for cans varying in length from 2 to 16 inches and in diameter from 2 to 14 inches.

The whaleback Charles W. Wetmore was peculiarly unfortunate in losing her rudder near the mouth of the Columbia River, after having nearly completed her voyage from New York to Puget Sound. The rivets gradually gave way until the steering power was gone, making necessary the payment of a heavy salvage to the steamer taking her in tow.

The Rose Fuel Gas Process.

We have had occasion to refer repeatedly to the efforts being made to introduce the Rose fuel gas process, which is now being introduced experimentally in one of the works of Carnegie, Phipps & Co. of Pittsburgh. The apparatus employed is shown in the accompanying engravings, reproduced from a patent granted to James M. Rose, of Allegheny, Pa., on October 13, 1891. It will be observed that it consists of two sets or sections identical in construction, each section consisting of three cupola chambers, A, B, C, above which there are two vertical chambers, inclosed within horizontal cylindrical casings, from which depend cylindrical legs connecting with the horizontal casing F, all formed of heavy plate. Each of the cupola generators A, B, C, is provided with grate bars and with air and steam blast pipes at the base, while there are inlets in the upper part of the cupola, one of which, as marked in the engraving, is employed for the admission of steam while the other two are generally used for air. The vertical chambers D and E communicate with the cupola generators B, C, through ports, *d* and *e*, being separated by a division wall, *d'* but having a communicating port, *e'*, in its upper part. Through the chamber D passes the vertical cylinder K, which communicates at its base with the generator A and with its upper part with the pipe *k*, which is controlled by a valve opening into the side pipe, *m*. A similar cylinder, L, communicates with the cupola generator B and that, too, connects with the pipe *m*. A flue, *h*, communicates with both of the chambers, D and E, to allow for the escape of the waste product during the process of heating up the chambers. The function of the chambers D and E as accumulators of heat may be aided by filling them with checker-work, loose refractory material, or with deflecting walls. At *i*, near the base of the cylinder K, is an inlet for the hydrocarbon, so placed that when introduced they are vaporized and carried up-

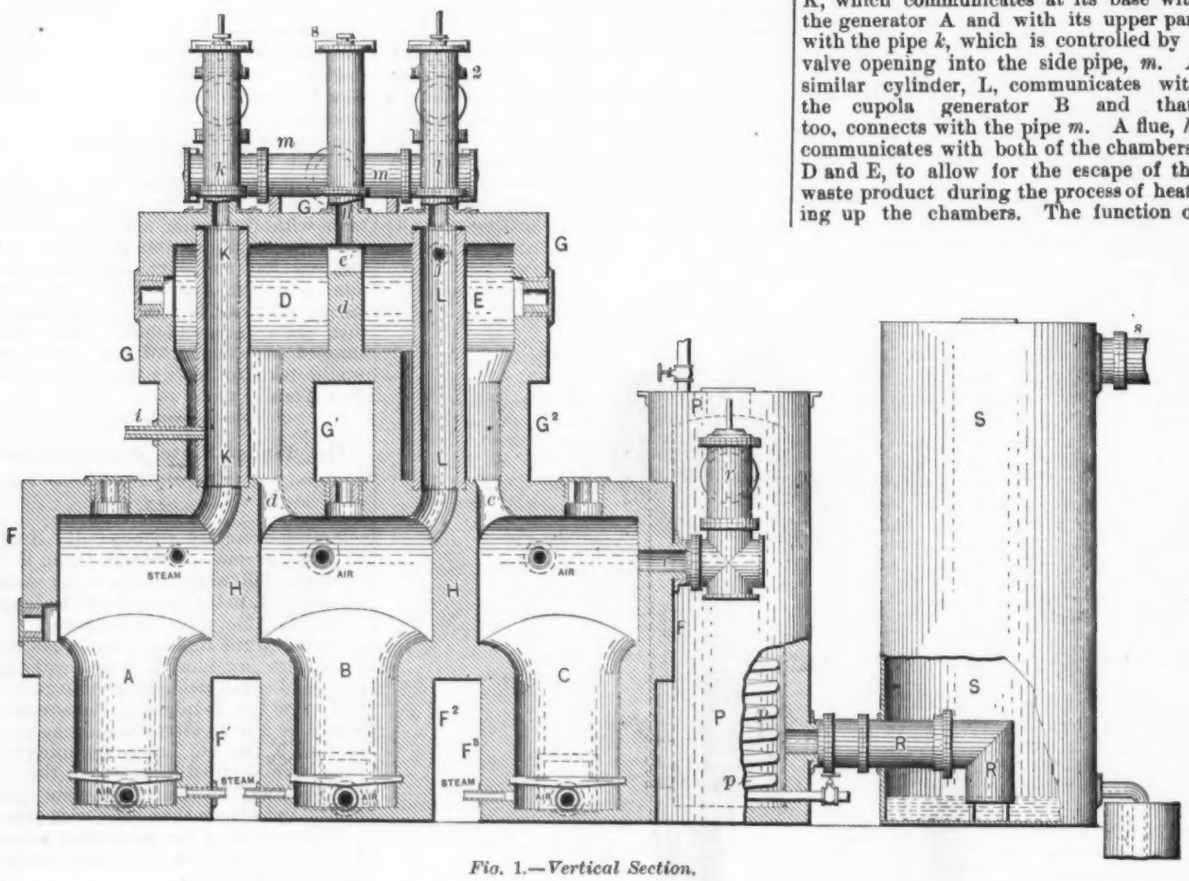


Fig. 1.—Vertical Section.

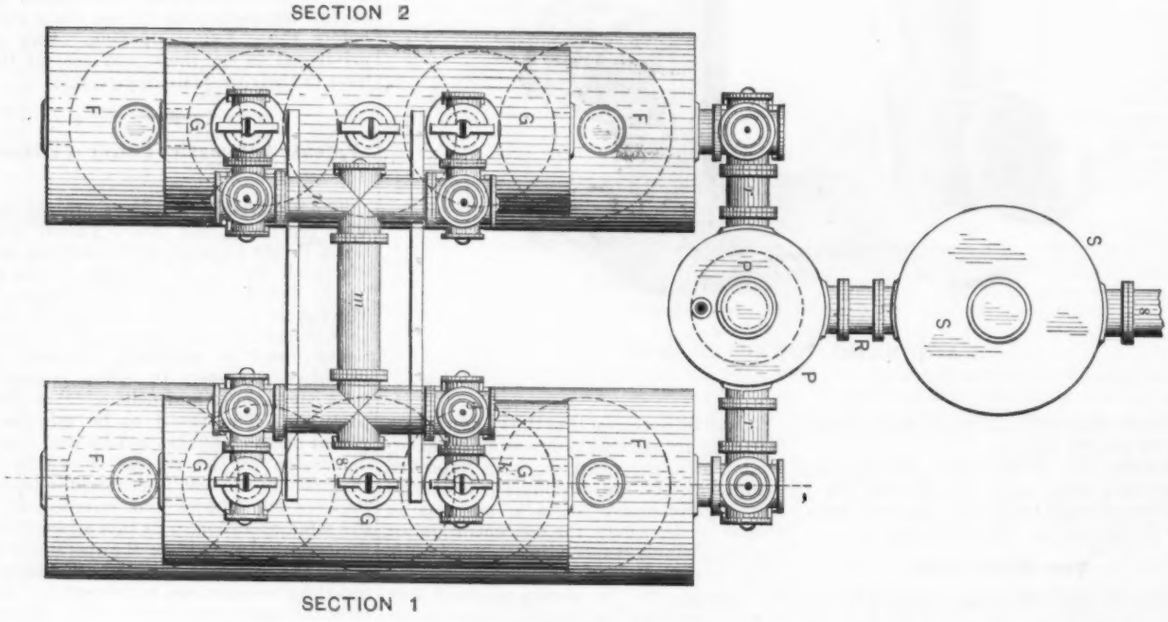


Fig. 2.—Plan.

THE ROSE FUEL GAS PLANT.

ward by the gases. Similarly at *j*, at the cylinder L, is a second inlet blast at the upper end of the cylinder, because the gases descend in it. For superheating the steam used in the apparatus a superheater, P, is provided between the two sections, the steam passing through a system of coils, *p*. The heating in the superheater is done by the escaping gases, which subsequently pass through the scrubber S.

The method of operation of the plant is as follows: The producer gases formed in the cupola generators A of each cylinder pass upward through K, thus heating it, and go through the pipes *m* and *n*, through the cylinders L into the upper part of the producer B, mixing with the gas there formed and burning within the cylinder chamber D, to assist in the superheating in the cylinder K. When

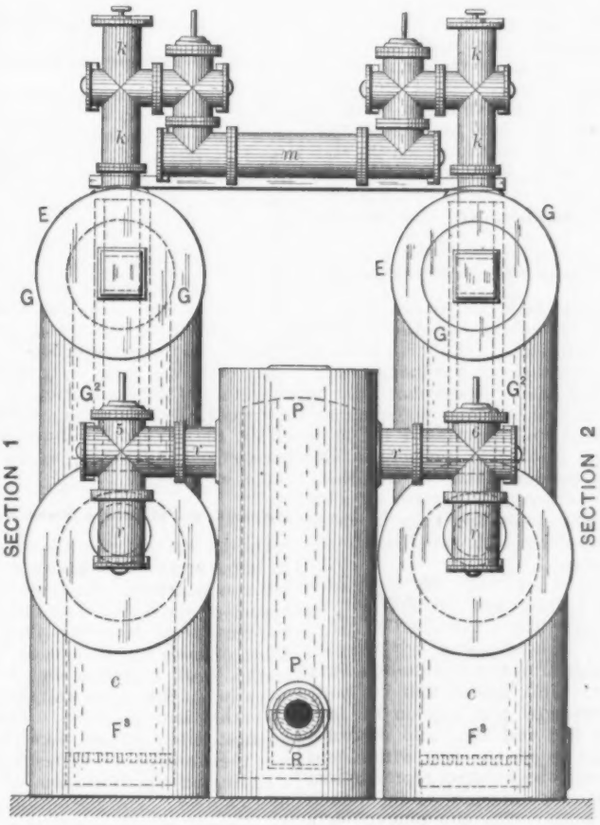


Fig. 3.—Side Elevation.

THE ROSE FUEL GAS PLANT.

the proper temperature has been reached hydrocarbons are introduced through the pipe *i*, the amount being about one-third of that required in forming the final gases. The gases so formed enter the cylinder L, steam being at the same time introduced into the cupola generator A of section 2, forming water gas. This water gas is enriched with hydrocarbon and passing through the cross pipe *m* enters through the vertical cylinder L, commingling with the gases formed in generator A of section 1. As these commingled gases enter the cylinder L an additional quantity of hydrocarbon is sprayed into it. Thus they enter the producer B of section 1, in which water gas has been produced. The product rises into the vertical chamber D, passes through the port *e'* into the vertical chamber E, goes into the upper portion of the producer C, where again it mingles with water gas formed in this producer, both together escaping through the pipe *r* into the superheater and finally into the scrubber. When it is found necessary to reverse the apparatus on account of the cooling down of generator A of section 2 and of the generators B C and cylinders K L of section 1, the air blast is put into the generator A of section 1 and producers B C of section 2 being cut off, steam is fed into producer A of section 1 and producers B C of section 2, which have been highly heated by the air blast, and air is allowed to enter the producer A of section 2. At the same time a similar amount of air is fed into the producers B and C of section 1 and is burned in the chambers D and E of the same section to heat them up ready for subsequent reversal. The principal object aimed at is to thoroughly decompose the hydrocarbons by injecting them in small quantities at a number of different points, and thus to avoid the cooling down of the apparatus which would grow out of the introduction of large quantities of hydrocarbons at any one point. Mr. Rose also states that a further point aimed at is to bring the resultant gases into an atmosphere of hydrogen and carbonic acid, after the introduction of the hydrocarbon, with the object of facilitating the union of the nascent hydrogen with the hydrocarbons in the form of marsh and similar hydrocarbon gases.

"Locomotive Engineering." — The *Locomotive Engineer* was recently purchased by Angus Sinclair, who for the past seven years has been editor of the *National Car and Locomotive Builder*, and John A. Hill, who had been editor of the *Locomotive Engineer* since its establishment. The January issue of this journal will be materially increased in size, and will appear under the name of *Locomotive Engineering*. It will be devoted to railroad motive power and rolling stock. The practical experience and extended newspaper work of both editors guarantees the increased success of the paper.

WORLD'S FAIR NOTES.

The Harbor Arrangements.

The exposition attractions in the vicinity of the main lagoon entrance, just south of the great Manufactures Building, are to be quite different from those originally planned. No Casino will stand at the end of the pier 1000 feet from shore, and there will not be a curved mole bearing columns emblematical of the thirteen States. In place of the latter there will be a peristyle, 60 feet wide and 500 feet long, extending north and south and spanning the lagoon entrance by a grand arch. Ranged along this peristyle will be emblematic columns representing all of the States and Territories. At the north end of the peristyle will be placed the Music Hall, which for a time it was thought would have to be put on the wooded island. It will measure 140 x 200 feet, and will have an auditorium large enough to seat 2000 people, with an orchestra of 75 pieces and a chorus of 300 persons. It will also have a rehearsal hall 50 x 80 feet, capable of seating 600 people. This Music Hall is designed to be used by musical talent and connoisseurs of the art rather than by the mass of people who will visit Jackson Park. It is intended that here shall gather the fine singers and instrumentalists who may wish to be heard and criticised by the best representatives of their art or profession.

The grand choruses and band concerts—the popular musical entertainments—will be held in an amphitheatre accommodating 15,000 people or more. This will be in the extreme southern part of the park and, after the close of the projected musical programme, will be transformed into a live-stock show ring. At the south end of the peristyle there will be a restaurant and café, of the same size and style as Music Hall. This will be constructed to supply the main features of the abandoned Casino. The plans for these changes, which have been adopted by the Ground and Buildings Committee, were made by Designer-in-Chief Atwood of the Construction Bureau. The estimated cost is $206,000, or $1000 less than would be necessary to carry out the plans which were abandoned. The pier, extending 1000 feet into the lake, is already completed. At its extremity, in place of the Casino, will be erected a tower 250 feet high. This will be of iron, covered with staff, and will resemble a lighthouse in appearance. From its summit electrical displays of exceeding brilliancy will be made, and by means of electric "search-lights" the grounds, or any particular portion of them, can be flooded with light on fete nights.

Transportation Building Exhibits.

A *fac-simile* of the manufacturing town of Pullman is to be one of the attractions in the Transportation Building. The representation will be 30 x 80 feet in extent, and will be a perfect mirror of all the institutions — factories, homes, fountains and parks—in the village of Pullman. Architect S. S. Beaman has been commissioned to go ahead with the plans, regardless of expense. Mr. Pullman thinks that in the town which bears his name he has solved many perplexing social problems, and he purposes to call the attention of the economic congress to be held during the fair to what has been accomplished at Pullman. Besides this model village the Pullman exhibit will embrace a complete line of everything manufactured at the Pullman factories. This means everything used on railroads except locomotives and steel rails. Other big companies are preparing extensive exhibits for this department. The Lehigh Valley Railroad Company, who make much of their own rolling stock, will show in a practical way what

they do in that line. The Baldwin Locomotive Works, at Philadelphia, the largest in the world, will show 12 or more different patterns of locomotives. The Baltimore and Ohio Railroad intend to show the progress of their development from a tram road to a steam railway. Major J. G. Pangborn has been intrusted by the road with the duty of making the proposed exhibit.

Progress of Construction.

The wintry weather which has latterly been experienced has not been permitted to seriously interrupt the work of erecting the exposition buildings. Much progress has been made the past week.

The Agricultural Building has risen high in the air. The week's work has been placing the columns for the walls and putting in the gallery girders. The little Dairy Building has begun to assert itself, and will be finished long before the contracted time. The foundations and joists are in and the laying of the floor is proceeding.

The skylights in the roof of the Woman's Building have been completed. The work of putting on the exterior covering is in progress on all parts of the building. The order has been issued to lath and plaster this building at once, although it was contemplated putting this work off until spring.

The Horticultural Building is growing rapidly. The main entrance is framed, and the roof trusses are going up between the dome and the north pavilion. The north pavilion is up and the south pavilion is in the second story. The iron work for the dome is being put in place.

A big force of men is at work on the Mines Building, placing the exterior covering on the south end and finishing the roof on the same end. One hundred and fifty carpenters are finishing the corner domes on the north end of the building. This will be the first of the main buildings to be completed.

The east arcade of the Fisheries Building is practically finished, and the iron work of the east aquarium is nearly done.

The superstructure is going up on the Government Building. This building is apparently being built to last for all time. The foundations in it are heavy, and the joists for the floor are 3 x 14 inch timbers and only 9 inches apart.

The Administration Building already begins to show some of its prospective beauties. Work is proceeding on the four pavilions, and a large amount of the ornamental exterior covering is in place on the northeast pavilion. This pavilion makes a showy appearance.

No progress has been recently made on the Manufactures' Building, but when the necessary details are completed, which will be some time this week, work will proceed in earnest. This building will cost some $1,500,000. If it had been erected according to the original plans it would have cost but $1,000,000. The roofing over of the inner courts, causes the increased expense. The Edgemoor Bridge Works have the contract for the iron work for roofing the courts. Over 6000 tons will be required. Their bid, as stated last week, was 4.29 cents, but since then the specifications have been so modified by the committee having the contract in charge that the bid has been reduced to $4\frac{1}{10}$ cents per pound.

The wooden trusses are being erected for the Forestry Building. There is not an iron rod or bolt visible in this building and no iron will enter into its construction.

Work in the Landscape Department is keeping 400 men busy. One hundred men are working in front of the Art Hall making terraces and enlarging the lake. When the water is turned in through the coffer dam this lake will be twice its former size. One hundred men are planting trees and bushes, and a force is engaged in grading down the shore lines of the lagoons.

The propagating houses at the corner of Fifty-ninth street and Midway Plaisance are filled with a myriad of little plants, which are to beautify the wooded island and the grounds in 1893. There are growing in the hot houses now 900,000 plants. These include aquatic plants for the interior waterways and ornamental plants for the landscape designs throughout the grounds.

On the Agricultural and Transportation buildings there has been a mushroom-like growth. To detract from greater progress there has been a lack of iron. Notwithstanding this, nearly all of the 64 gallery trusses of the Transportation Building have been put up, and the sheathing of the roof has been carried along with the truss raising. Three hundred and thirty men are employed on the building.

It was announced last week that staff work on the exposition buildings would not be delayed on account of inclement weather. Chief of Construction Burnham was authorized to permit the construction of sheds on the grounds in which the staff makers can work all winter. Moving workshops, which can be hauled from one building to another, will also be constructed.

Exhibit of the Naval Department.

A large area at Jackson Park has been reserved for the exhibit of the United States Government. On this will be erected the Government Building. With one exception every department will be represented in this building, and the open space around it will be utilized for military displays and other purposes. The exception referred to is that of the Navy Department, which will contain an altogether special and novel pavilion, in which exhibits connected with this Department will be collected.

This pavilion will take the form of a line-of-battle ship, and in fact will be above the water line a full-sized model of the Indiana, Massachusetts and Oregon, recently designed by the Washington Navy Department. This model will be built upon a submerged platform on the lake and will be 348 feet long and 69 feet 3 inches beam; in all respects, within and without, it will be an exact reproduction, except as regards materials, of the vessels now being built. The site selected is a little off shore and the vessel will be protected by a breakwater 900 feet long, 30 feet wide and 12 feet above the water level.

New York's Attitude Toward the Fair.

The Chicago newspapers express much gratification at recent manifestations of increased interest in the World's Fair by citizens of New York. The following extracts on the subject are taken from the Chicago *Tribune:*

"New York has at last become aroused in the matter of making an exhibit at the World's Fair. Citizens of that State have up to date subscribed approximately $158,950 toward the general enterprise. Meanwhile the newspapers of the Eastern metropolis have come over to the side of Chicago in advocating the interests of the exposition, and the New York Chamber of Commerce has asked that an appropriation of $1,000,000 be made by the State Legislature of New York. This amount is deemed excessive, and the appropriation which is generally considered as fitting for the State is $250,000. However, prominent citizens will go ahead in endeavors to secure a larger amount from the State.

"Much credit for the change of sentiment in New York is accorded to Chauncey M. Depew, who recently visited Chicago and spent an afternoon at the exposition grounds. Mr. Depew returned to New York and in a number of interviews which appeared in the New York newspapers gave such a flattering account of the exposition and its probable magnitude that everybody in the Empire City seems to have fallen into line.

"The newspapers which formerly printed almost drastic criticisms on the fair have dropped over to the side of the exposition, and their editorial as well as news columns have been filled with favorable reports. But even while the unfavorable comment was being printed the manufacturers and merchants of New York were asking for space in the exposition buildings.

"World's Fair directors are greatly pleased at the present attitude of New York, and have nothing but praise for the manner in which the Empire State is coming out for the exposition."

Two Departments Harmonized.

Exhibitors in the Department of Electricity, it appears, will have to deal with both Chief of Construction Burnham and Chief Barrett of the Department of Electricity. A set of joint regulations will be shortly issued in one pamphlet for the information of intending exhibitors. Those who wish to have their machinery used in furnishing either power or light for the grounds and buildings will be obliged to make terms first with the chief of construction. After that their exhibits will be under of the supervision of Chief Barrett. This was practically agreed upon at a meeting of the Committee on Electricity, last week. By this arrangement the claims of Mr. Barrett and Mr. Burnham are to be harmonized and peace, as far as practicable, will follow.

Important World's Fair Conference.

On the 9th inst. the opening sessions of an important conference were held at the fair headquarters. Representatives of the various State World' Fair boards met for the purpose of receiving from the exposition officials suggestions as to the best methods of carrying on World's Fair work in the States, as well as for stirring up enthusiasm generally. The action of greatest public interest taken by this body was the passage of a resolution recommending an appropriation of $5,000,000 by Congress. The resolution, offered by Mr. Farquhar of Pennsylvania, is as follows:

Whereas, The convention of delegates having in charge the interests of the States they respectively represent in the World's Columbian Exposition having carefully investigated the scope and plan of said exposition, and the ways and means provided for completing the preparations in a manner adequate to the requirements of a national undertaking, deem it proper to give public expression of the result of their inquiries, observations and conclusions in the form of the following resolutions:

Resolved, That the World's Columbian Exposition is an enterprise in all respects national and international in its character, having been authorized and promoted by the Congress of the United States. The act of Congress, as a condition precedent to locating said international exposition at Chicago, required the citizens of said city to furnish a satisfactory site and $10,000,000, this sum being deemed by Congress sufficient to complete the work of preparation. We find that the citizens of Chicago have complied fully with the requirements of said act of Congress. They have provided an ample and admirable site, and have furnished more than $10,000,000. We find also that the growth in every department of science, industry and art, and the interest manifested by all the nations of the earth in the proposed exposition, celebrating an event marking an important epoch in the history of the world—the discovery of America—renders it absolutely necessary for the commission having jurisdiction to enlarge the scope and plan of said exposition beyond what was originally contemplated, in order that it might fulfill its mission and comport with the true dignity of the nation. In this the National Commission

has but complied in a reasonable manner with the obvious demands of the act of Congress.

We find that the work has proceeded according to the plans provided by the National Commission, that great progress has been made, and no doubt has been left in our minds that if those in charge of the enterprise are properly sustained by the general Government, as they deserve to be, the exposition will in every respect far surpass in extent and useful influence any that has been heretofore held.

After having studied with care the scope and plan of the exposition, the work so far as it has progressed, and the estimates submitted by the Finance Committee, we are satisfied that at least $18,000,000 will be required to fully and properly complete the work of preparation in a manner creditable to the nation.

We affirm without hesitation that the representatives of the people of the United States in Congress should promptly appropriate $5,000,000 for the completion of this national enterprise projected by them. The advantage of the exposition are to be reaped by the citizens of the entire United States. The people of Chicago have contributed $5,000,000, the city $5,000,000, and it certainly would be reasonable under the circumstances for the rest of the country to contribute an additional $5,000,000, since the advantage to it is beyond calculation.

As above stated, this is a national enterprise, and the credit of the country is at stake. If it fails it will do us incalculable injury, if successful incalculable good. The work should be completed in a manner commensurate with the greatness of the nation and the importance of the event celebrated or it should never have been attempted.

Representing the several States of the Union, we recommend our constituents to use their influence to secure an appropriation by Congress of $5,000,000, upon such terms as may seem just and equitable.

After the reading of the resolutions B. F. Haven of Indiana moved to strike out the word "appropriation" and insert the word "loan," and the amendment appeared to be carried by only a few voting, but before the vote was announced Gen. St. Clair of Virginia attracted the attention of the conference and then proceeded to make a speech in favor of the resolution, which was so able and convincing that the resolution as read was adopted practically unanimously.

Commissioner M. H. De Young wants the Government to coin a special 50-cent piece as a special World's Fair souvenir, which shall also serve as an admission ticket. At the meeting of the State Boards he secured the adoption of the following:

Resolved, That it is the sense of the convention of the representatives of the boards of the various States of this Union that the Government of the United States be requested, in commemoration of the Columbian Exposition and the event it celebrates, to coin through its mints pieces of the value of 50 cents. This being the probable price of admission these coins can be used for that purpose and will make valuable souvenirs. The component parts of said coin to be of gold and silver in due ratio. That 5,000,000 be struck, and they be made legal tenders. That the secretary of this meeting be requested to forward this resolution to Congressman Springer of Illinois with a request that he introduce such a bill and present this resolution to Congress.

Mr. De Young explained that the due ratio between the value of gold and silver is in weight as 16 to 1. "The coin would be smaller than the regular silver half dollar," said Mr. De Young, "but according to my idea it would be a legal tender, just the same."

The President's Views.

It is telegraphed from Washington that World's Fair matters will be brought to the attention of Congress in a special message. While it is not stated that President Harrison will specifically recommend the $5,000,000 loan, his indorsement of the fair as a national project will be a virtual recommendation for favorable legislation. The reports of President Palmer of the National Commission and of Mrs. Potter Palmer of the Woman's Board will be sent to Congress by the President so that the lawmakers will have information of the work already done.

The Treasurer's Report.

Treasurer Seeberger has made the following monthly report of the exposition's finances. It shows a balance of $934,304 in bank:

Balance received from temporary organizations	$4,252.64
Received on current installments of stock subscriptions	3,232,496.80
Received from banks for interest on deposits to November 30	31,983.89
Miscellaneous receipts from sundry resources	10,982.92
Received various stock collections, not yet classified	970.40
Total	$3,281,686.65
Total disbursements on vouchers as per daily report of auditor	$2,347,382.58
Total available cash	934,304.07
Total	$3,281,686.65

Rules for Transportation Exhibitors.

Special rules for the guidance of intending exhibitors in the Department of Transportation were sent out by Chief Willard Smith the past week. They are as follows:

Rule 1. Power (electric or compressed air) will be furnished for operating such machinery or appliances as can only properly be shown in that manner. No direct steam power will be furnished, nor will any lines of shafting be erected in the building. Electric or compressed air power must be taken direct, and the exhibitor must furnish his own motor for utilizing the same.

Rule 2. Steam heat will be furnished under adequate pressure for testing car-heating and other devices requiring it. The escape of such steam into the atmosphere will not be permitted, and the exhibitor must provide for taking care of condensation.

Rule 3. Loan exhibits accepted by the chief of the department will be cared for without expense to the owner. Special arrangements will be made in each case for exhibits which are non-commercial in character, but designed to add to the completeness and educational value of the exposition.

Rule 4. Platforms, counters, ornamental partitions, showcases, &c., will be at the expense of the exhibitors and must not exceed these dimensions: Showcases, 15 feet above the floor; counters, 2 feet 10 inches; platforms, 1 foot.

Rule 5. All exhibits of machinery in operation must be inclosed by a railing 2 feet 6 inches in hight to come inside the space. Railings of the same hight may be used to inclose and protect other exhibits, in the discretion of the chief of the department.

Rule 6. No signs will be allowed to extend over the passageway, and no signs will be allowed made of muslin, linen, canvas or paper.

Rule 7. The department will lend any proper assistance to exhibitors in securing the services of reliable attendants or caretakers.

Rule 8. The chief of the department reserves the right to modify any of the above rules, upon proper occasion, and to promulgate such further rules as he may deem necessary from time to time.

Brevities.

Carl Vogele, the managing director of Siemens & Halske of Berlin, has asked for space for a special building in which the firm might make a display of its electrical machinery and appliances. Herr Vogele said his firm would expend 900,000 marks or approximately $225,000 on its exhibit. It has been almost decided that a special building could not be granted, but 30,000 square feet of space will be allotted in the Electricity and Machinery buildings.

The Committee on Ceremonies have decided to appropriate $25,000 for electric fireworks at the time of the dedication of the buildings in October, 1892. Secretary Culp was instructed to prepare a series of historical designs to be shown in the display.

The Committee on Liberal Arts have adopted the recommendation of Chief Peabody that 400,000 square feet be set aside in the Manufactures Buildings for a display of liberal arts.

Half a million dollars will be expended on lavatories and toilet rooms on the exposition grounds. The contract for constructing them was practically awarded last week by the Committee on Grounds and Buildings to James B. Clow & Son of Chicago. There will be 3000 lavatories and toilet rooms.

The Marinette Iron Works.

The Marinette Iron Works Company are located at West Duluth, Minn. Their works embrace a machine shop and foundry, with the usual adjuncts. Their headquarters were formerly at Marinette, Wis., and were removed to West Duluth within the past two years. They have not wholly abandoned their establishment at Marinette, but use it mainly for repair work, of which they usually have a great deal on hand, since this establishment is situated in the heart of a large lumber district. The special work of this company is the equipment of saw mills, but they have recently gone more largely into the manufacture of engines and mining machinery. They have recently taken some excellent orders, including a triple-expansion engine for the American Steam Barge Company of West Superior, Wis. The establishment is not so busy in a general way, however, as it has been. From 400 to 500 men are employed when work is pressing.

The company have been especially regardful of the comfort of their men. The washrooms and all toilet accommodations are of the very best character. The surroundings are exceedingly pleasant in every respect, and one would suppose that a man finding his lot cast with employers so anxious to minister to his comfort would hesitate about leaving them to engage with some other establishment not so well provided with accommodations of this character. It is proposed further to fit up a reading room and lecture hall in the second story of the office building, which will be dedicated solely to the use of the workmen.

The buildings of this company are of a much more elaborate character than is usually seen among the machine shops and foundries of the Northwest. They are constructed of red brick, and considerable attention has been paid to their architectural features. The facilities are also of the best character. Tracks run from the railroad through the several departments. The one in the machine shop passes directly under a 10-ton traveling crane to facilitate loading and shipping completed work. The arrangements in the foundry are made with a view to handling very heavy castings. The horizontal engines built by this company are of peculiar pattern, having an outside bearing for the end of the piston, instead of the cylinder head presenting the usual smooth and unbroken surface. This outside bearing is intended to take the wear of the piston from the bottom of the cylinder.

The officers of the company state that this method of supporting both ends of the piston has proved to be very popular with their customers.

The famine in Mexico becomes more severe as time passes, and the population in some sections is clamorous in its demands on the Government for the removal of the duties on American corn. Jalisco and Zacatecas have already petitioned Congress on this subject, while some other States have issued proclamations setting forth the hardship of the situation. The church authorities as well as private individuals state that considerable sums are available for the purchase of American corn, on favorable conditions. Prices of food products have doubled now that black beans, the usual staple, are not to be had. A well-informed correspondent says that unless Congress affords relief many deaths must occur.

THE AMERICAN TOWER.

WITH SUPPLEMENT.

Although it is not yet finally decided, it is highly probable that one of the features of the Columbian Exhibition will be a great tower. A company has been formed under the title of the American Tower Company, with a capital stock of $1,500,000, of which over $1,000,000 has already been spoken for. Options have been secured to purchase grounds immediately adjoining the World's Fair grounds in Chicago. Arrangements can be made with the World's Fair officials, if desired, so that the tower grounds shall be included under their jurisdiction. After long and careful study, designs have been prepared by the eminent engineer, George S. Morison, of Chicago, the designer and builder of some of America's most famous bridges.

It is conceded that the Eiffel Tower was one of the chief attractions of the Paris Exposition. Its facilities, however, were utterly inadequate for handling the people. Nothwithstanding this, there were 3,512,000 paid admissions to it. It is also remembered that people had to wait from three to six hours before getting an opportunity to ascend the tower. It is not a question of patronage, but of handling the crowds. The actual cost of the tower will be about $1,500,000. The cost of the Eiffel Tower was a little less than $1,700,000, with cheaper labor and with the price of steel very much less than in this country. The American tower can be built for less money, notwithstanding its greater size and earning capacity, on account of its greater simplicity of design, in which standard and merchantable sizes of steel are used. There were 28,149,353 paid admissions to the Paris Exposition. It is confidently believed by those who have given the most study to the subject that the attendance at the Chicago Exposition will equal, if not exceed, this total. The Keystone Bridge Company are ready to undertake the erection of the proposed tower under the direction of George S. Morison, and give heavy bonds to complete it in time.

General Description.

The general arrangement of the tower and the arrangement of the accommodations are modeled from those of the Eiffel tower at Paris. The base of the tower is made approximately two-fifths of the hight; 200 feet above the base is placed the first platform, a large platform to be occupied by promenades, restaurants and miscellaneous accommodations, this platform being high enough to command the best view of the entire exposition grounds and buildings. The second platform is placed 200 feet higher up than the first platform, though it will not be of so much importance; 500 feet higher up is the lantern, which is the principal point for distant views, and is surmounted by a lighthouse and flagstaff, the whole having a hight of 165 feet.

While, however, the general arrangement is derived from that of the Eiffel Tower, the system of construction is necessarily of a very different character. The problem to be solved was to design a tower to be carried on the soft soil on which the city of Chicago is built, this soil being a fine sand which carries large weights perfectly well when they are properly distributed or supported, but has little power in itself to resist lateral thrusts. This rendered anything like the inclined supports of the Paris Tower inadmissible, and further, made it necessary to provide for the expansion of the metal of the tower in a manner which would not strain the foundations.

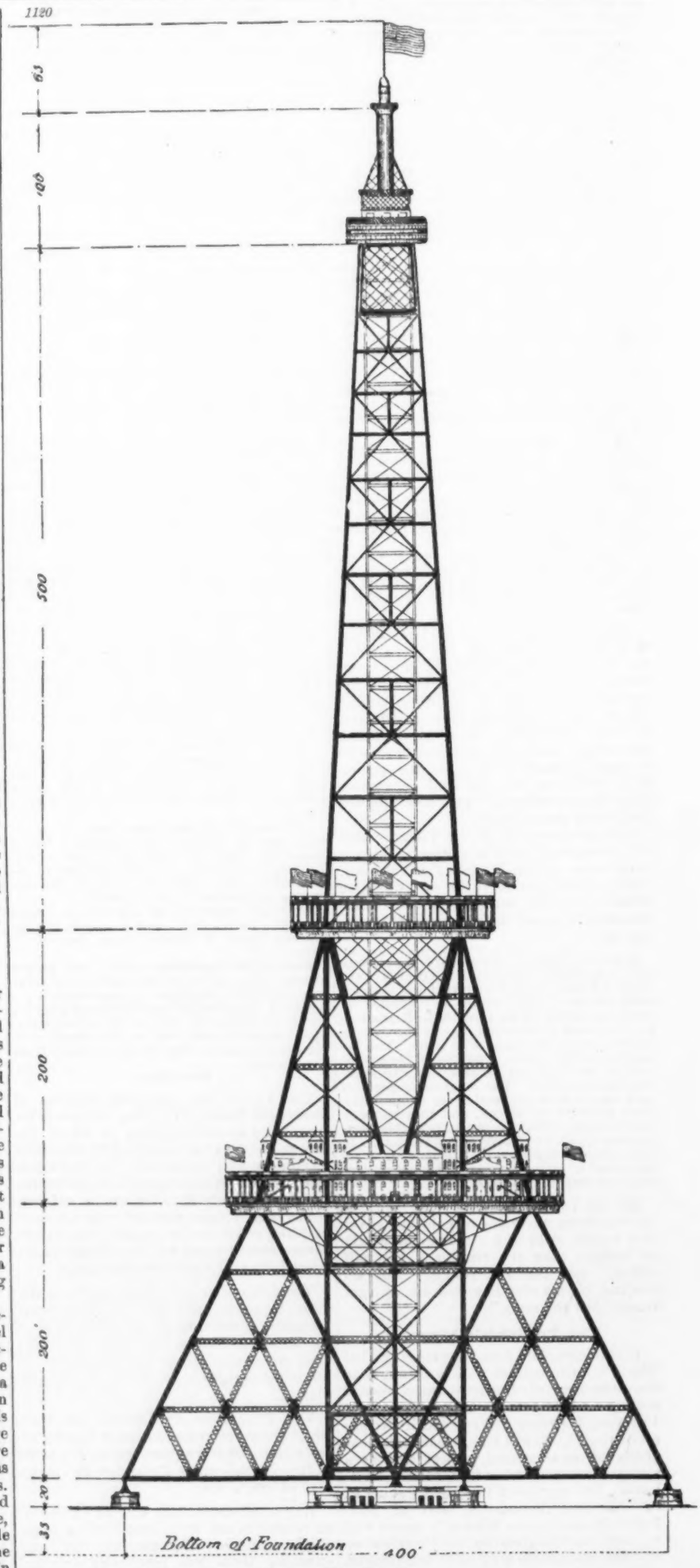
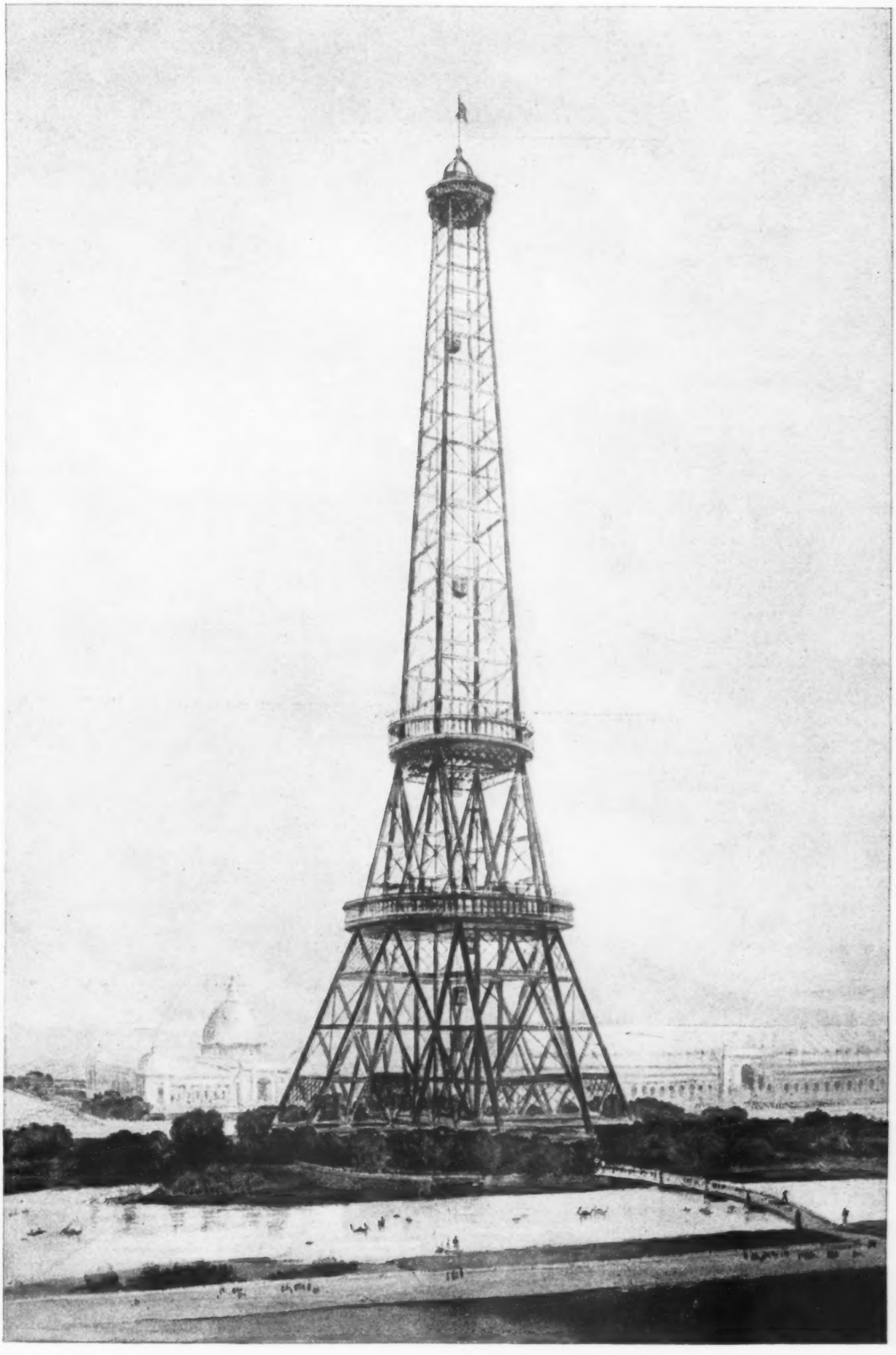


Fig. 5.—Side Elevation.

THE AMERICAN TOWER.



THE AMERICAN TOWER—COLUMBIAN EXHIBITION.

Besides these considerations of foundations, it was also necessary to design a tower which can be built in the shortest possible time and erected with a maximum speed. This made it necessary to confine the construction to right lines and square angles. This led to the selection of the plan adopted, Fig. 1. The upper shaft from the lantern V down to the second platform I, is a square shaft battering from 40 feet square at the top to 100 feet square at the base, the entire weight being carried by the four corner posts which are stiffened by bracing in each of the four planes. The details are of much the same character as those of the high towers of an iron viaduct. It is the simplest possible form of construction as well as the strongest and most easily erected.

From the second platform I, Figs 1 and 2, to the first E, each of the four sides of the upper shaft is continued downward in a vertical plane, the four planes intersecting each other on vertical lines 100 feet apart. Each of the four corner posts is therefore over one of the intersection lines of the planes, and the weight from each of the corner posts is distributed on four posts, two in each plane, these posts battering from each other with an inclination of one in four. The section of the tower, therefore, between the first and second platform consists of 16 posts, of which four are in each of the four planes, the interior posts coming together at the base, and the arrangement of the four posts being like an inverted W 300 feet high and 200 feet wide. The shape, therefore, of the tower at the level of the first platform is cruciform, E, Fig. 2, measuring 200 feet in each direction and 100 feet across each arm. The posts are braced together at intervals of 50 feet in the four planes.

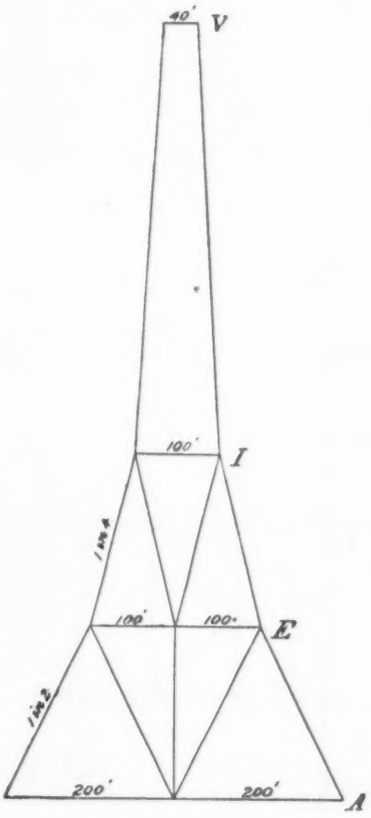


Fig. 1.—Outline.

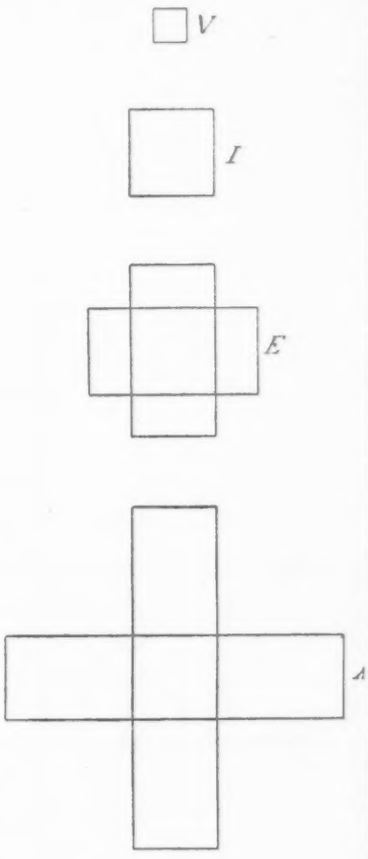


Fig. 2.—Plans.

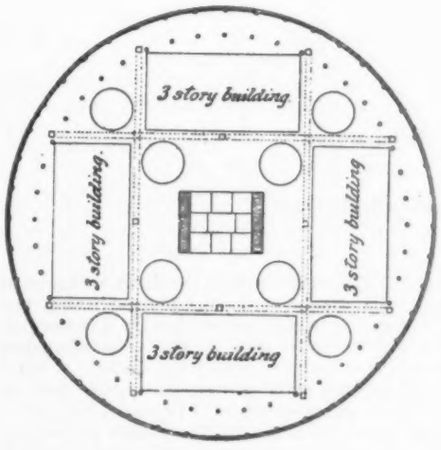


Fig. 3.—First Platform.

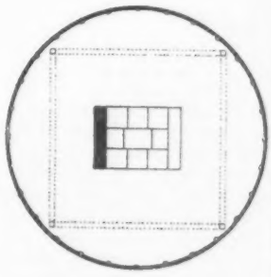


Fig. 4.—Second Platform.

THE AMERICAN TOWER.

Below the first platform E, the weight from the eight interior posts is carried directly to the foundation by vertical posts, while the weight from the exterior posts is carried down on the same principle that the weight from the four posts of the upper shaft is carried—that is, by two equally inclined posts from each point. To bring these posts together at the center it was necessary to double the batter, making it one in two, Fig. 1, instead of one in four. Each plane, therefore, of the lower 200 feet of the tower becomes an inverted W, 200 feet high and 400 feet wide on the base, with a vertical member in the center. The members of this plane are stiffened by bracing placed every 50 feet. The base of the tower is then of cruciform section A, Fig. 2, each arm being 400 feet long and 100 feet wide.

The weights of the lantern and the several platforms are provided for at their several levels.

With this arrangement more than half the total weight of the tower is carried on four central points and is a fixed quantity. The remainder is carried on eight outlying piers and varies with the wind pressure. The live load is distributed in the same way, but of course is variable everywhere. The four central points of support are made fixed points and rest on piers which are united into one great foundation. The bearings on the outlying points are all made with expansion links which are able to resist both tension and compression, and the lines of motion of these links are made radial to the center of the tower, so that the expansion of the metal both longitudinally and transversely is provided for at the same time. The only expansion not provided for is that due to different temperatures in different parts of the lower horizontal plane, which is so small that it may be neglected. The entire structure is tied across the base and is complete in itself, the only stress transferred to the foundations being a vertical pressure.

The maximum weight thrown by the tower with a complete estimated live load on each of the four central points is 1760 tons, or in round numbers 7000 tons on the whole foundation, and the maximum weight thrown on each of the eight outlying piers is 880 tons, this, however, being largely due to wind. The dead load alone thrown upon each of these piers is less than 300 tons. If these weights are compared with the weights on the foundations of many of the tall buildings in Chicago, and especially under the grain elevators, which are the heaviest and oldest structures in the city, it will be seen that in spite of the immense size of the tower, the foundations are a comparatively simple thing.

The weight of the structural portions of the tower above the masonry foundations is about 7000 tons. To this is to be added 2000 tons for the weights of floors and buildings, and 2000 tons more for live load, making a total weight of 11,000 tons, of which less than one fifth is variable. A grain elevator of 1,000,000 bushels capacity—and there are much larger elevators than this in Chicago—weighs, when full of grain, at least 50,000 tons, of which more than one-half is variable, besides which it exposes a large flat surface to the wind, and in all respects is subject to much greater disturbing elements than the tower.

Accommodations.

The accommodations, though following the same general arrangement, have been materially increased from those of the Eiffel Tower. The first platform, Fig. 3, which is supported on a cruciform section,

is made circular, this shape being easily adapted to the shape of the support. The platform is 250 feet in diameter. Around this platform runs a covered colonnade 15 feet wide, the roof being supported by two lines of columns, and a substantial fence being placed between the columns of the exterior row. This forms a continuous promenade unbroken by angles or any local features to check the movements of a crowd. Inside of the circular promenade the platform is left uncovered, except where occupied by buildings. The spaces between the colonnade and the planes in which the structural members are, give room for four large buildings 45 feet wide and 90 feet long. These buildings will be of light construction and three stories high, and will be occupied as restaurants; the lower stories will be only 7 feet high and used as serving rooms; the second and third stories will each be 15 feet high, and these, together with the flat roof, will furnish accommodations for chairs and tables. From each of these floors there will be an uninterrupted view, people on the first floor looking over those walking on the promenade, people on the second floor looking under the roof of the colonnade, and those on the roof looking over the roof of the colonnade. In the interior, besides the space occupied by the four large buildings, there will be room for a number of small buildings, to be occupied by various small booths and other buildings.

The lantern will be supported on the four-corner columns, which are 40 feet apart, the length of the diagonal being, therefore, about 57 feet. The lantern is made 60 feet in diameter and two stories high, each story, however, to be but 7½ feet high. This will give two rooms, each having a circumference of 188 feet, which would be the lookouts of the tower, thus giving nearly 400 feet of observation wall. The circular outside wall of each floor would be made solid for a hight of about 3 feet from the ground, the next 3½ feet will be of plate glass, and above this will be a frieze, which would be graduated to mark the points of the compass, and the names of important places can be painted in the proper directions; this circle will be of such size that each degree will be more than 6 inches long. Above the two observation halls will be an open gallery to which the public will not be admitted, but on which a small circular railroad can be laid on which a powerful electric light can travel so as to make variable effects of colored light, while within this track will be a smaller building containing rooms for special purposes. Above this small building a round shaft, made of boilor plate 12 feet in diameter, will extend 60 feet, this shaft will contain a spiral staircase leading to the highest platform of the tower 1020 feet above the graded surface of the ground. Above this platform will be a lighthouse surmounted by a flagstaff, the total hight from the ground to the top of the flagstaff being 1086 feet, and from the bottom of the foundation to the top of the flagstaff 1130 feet.

Within the main structure is to be built a secondary structure 36 feet square and of uniform size throughout, extending from the foundation to the lantern. This structure is to hold the elevators. It is divided into nine shafts of approximately equal size, eight of which will be occupied by the elevator cars, and the ninth at the center will hold the machinery. Each elevator car will have an area of 100 square feet and be capable of carrying 50 people. The four corner cars will run to the first platform, two of the others will run to the second platform stopping at the first, and the other two will run to the top of the tower. There will be separate entrances at the base to the three different classes of cars, so that no confusion can result. A double staircase will be built around the elevator shafts from the foundation to the first platform, and a single staircase from the first to the second platform. The general design of the tower is shown in our supplement, and in Figs. 5 and 6.

Construction.

Foundations.—The foundation work will comprise eight outlying piers supporting the exterior bearings of the tower, and the central pier, which supports the center bearing. The general principle adopted for these foundations is that of concrete piers resting on piles. The weight per pile will be limited to from 10 to 15 tons, according to observations to be made when work is actually begun. These weights are without any allowance for the bearing on the ground surface between the piles. If the piles were entirely omitted the weight on the surface would be from 1¼ to 1¾ tons per square foot. The concrete foundation will begin 2 feet below mean water in Lake Michigan, and the piles would extend up 3 feet into the matrix of concrete. All concrete will be first class Portland cement concrete. The central pier will contain 7500 yards of concrete and be supported on 1600 piles. Each of the outlying piers will contain 700 cubic yards of concrete and be supported by 185 piles.

Above the concrete foundation, which will be about level with the graded surface of the ground, will be built separate piers, one on each of the outlying foundations and four on the central foundation. These piers will be of limestone with heartings of Portland cement concrete, the piers on the central foundation being 30 feet square and 14 feet high, and those on each of the outlying foundations 20 feet in diameter and 11 feet high. The total amount of masonry and concrete in all the foundations is somewhat more than 15,000 cubic yards.

Structural Metal.

The tower will be built of mild steel and of wrought iron, wrought iron being used only in the lighter members. The principal columns are of square box section, fitted with manholes and interior ladders for purposes of inspection and convenience of workmen. These columns below the second platform will be 40 inches square, and above the second platform they will taper, decreasing from 40 inches at the base to 16 inches at the lantern. All the interior columns will be built of plates and angles with open-laced sides. All bracing and stiffening members will have riveted connections so that nothing can get loose. The compression members are generally square made of four angles at the corners and with all four sides laced. The tension members are made of four bulb angles placed in pairs back to back with a single line of lacing.

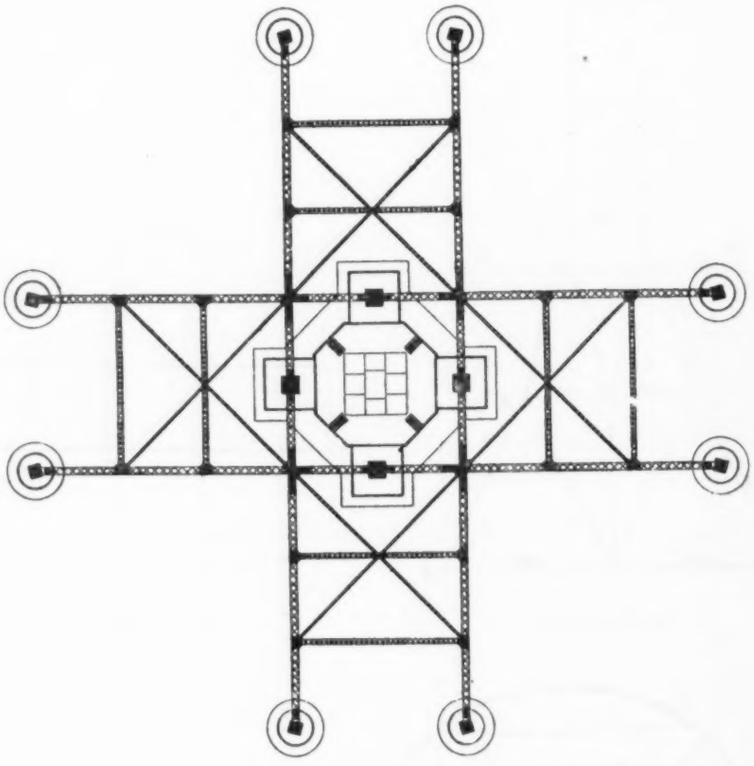


Fig. 6.—Bottom Plane.

THE AMERICAN TOWER.

The weights on all the floors are taken at 100 pounds per square foot, of which one-half is treated as live load. The weights of the tower used in the calculations are the actual weights of the metal. A wind pressure of 50 pounds per square foot on the entire structure is provided for, and a wind pressure of 80 pounds per square foot on the lantern is provided for in all members above the second platform. With these conditions the strains are limited to 14,000 pounds per square inch on square box columns within a maximum unsupported length of 16 times the width, and these strains are reduced for longer columns, or when thin metal is used in the plates. Where any member is subject to both tension and compression the sum of the two strains is used in determining the section. The interior elevator shaft will be of the same character of material and will rest directly on the central foundation. The entire structure will be incombustible, the floors of the platforms being covered with asphalt or cement concrete,

and no wood being used anywhere for structural purposes.

It is estimated that 5000 people can be accommodated at one time on the colonnade on the first landing; that 6000 to 8000 guests can be taken care of in the restaurants on the same landing; that the second landing can take care of 5000 to 6000 people, and that 1200 to 1500 people can be at the grand lookout. The four elevators to the first landing can handle 5000 persons per hour; the two which go directly to the second landing can take care of 1500, and the two fast elevators to the top are expected to carry 1000 people, so that in all 7500 people per hour can be transported. On this basis, the revenue, at 50c., 75c. and $1.50 respectively, is estimated at $3,750,000 for 150 days, with an additional revenue of $250,000 for privileges, above working expenses.

The Safety Valve.

BY G. D. HISCOX.

The safety valve being a vital point in the assurance of safety in a steam plant, and of equal importance with the water gauge and gauge cocks, it becomes the duty of every one owning or managing a steam plant to have the means of knowing the condition of all appliances that when neglected or abused might endanger life, property and business.

For this purpose we propose to put into easy form the methods for computing the value of the load on a safety valve, in several of the phases that may be presented, as well as some hints on dangerous practices in use by persons ignorant of the consequences attending trifling irregularities in their methods of thought and action.

The following letters referring to the cut, Fig. 1, are all the references necessary in the computation:

W = the weight of the ball in pounds.

L = the distance between center of weight and the fulcrum F in inches.

V = the weight of the valve and spindle in pounds.

A = area of the valve in square inches.

P = pressure in pounds per square inch at which the valve should blow.

w = weight of the lever in pounds.

g = distance between the center of gravity of the lever and the fulcrum in inches.

l = the distance between center of valve and fulcrum in inches.

The area A is obtained from the measurement of the diameter of the valve opening in inches, which should be squared and the product multiplied by the decimal 0.7854.

Most of the safety valves in the trade are made of specific sizes, corresponding with the sizes of iron pipe, and have areas equivalent to their nominal sizes, or of the following values:

	Square inches.
1 inch safety valve = ...	0.7854
1¼ inch safety valve = ...	1.227
1½ inch safety valve = ...	1.767
2 inch safety valve = ...	3.141
2½ inch safety valve = ...	4.908
3 inch safety valve = ...	7.068
3½ inch safety valve = ...	9.621
4 inch safety valve = ...	12.566
5 inch safety valve = ...	19.635
6 inch safety valve = ...	28.274

Now, having the necessary measures and weights, the formula for distance on the lever from the fulcrum at which the weight should be placed to blow at a required pressure may be expressed in the above notation as: Length,

$$L, = (\mathrm{P} \times A) - \left(V + \frac{w \times g}{l}\right) \times \frac{l}{\mathrm{W}}.$$

The reduction of the formula may be illustrated by the figures of an actual case, referring to the letters above and the figures to the above notation for a 4-inch safety valve to blow off at 70 pounds with an 80-pound weight:

$$\text{Length, } L, = (70 \times 12.566) - \left(5 + \frac{12 \times 20}{3}\right) \times \frac{3}{80}$$

Reduced this gives 29.798 inches from the center of the ball or its notch to the center of the fulcrum pin.

When the weight is required for a given pressure and length on the lever between the fulcrum and center of the ball or notch in which the ball hangs, the formula is:

$$\text{Weight, } W, = (P \times A) - \left(V + \frac{w+g}{l}\right) \times \frac{l}{L}$$

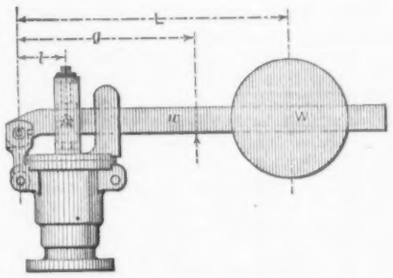


Fig. 1.—Safety Valve with Plain Lever.

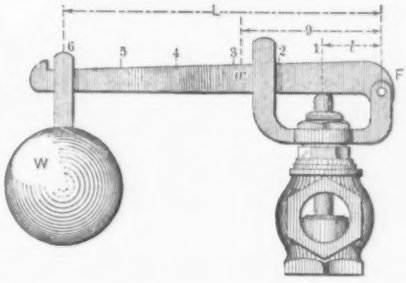


Fig. 2.—Safety Valve with Notched Lever.

It will be noticed that this formula only differs from the preceding one by the interchange of the first and last letters of the notation; otherwise to be worked out in the same manner as the first formula.

Taking the figures as before:

$$\text{Weight, } W, = (70 \times 12.566) - \underbrace{\left(5 + \frac{12 \times 20}{3}\right)}_{879.62} \times \underbrace{\frac{3}{29.798}}_{\frac{85.}{794.62}}$$

$$\frac{5 + 80}{3} = \frac{2383.86}{29.798} =$$

80. pound weight.

When the pressure is required at which the safety valve will blow off with a given weight set at a given distance, the other elements being known, the formula is:

$$\text{Pressure, } P, = \frac{\left(\frac{(w \times g) + (L \times W)}{l} + V\right)}{A}$$

Substituting the previous figures,

$$\text{Pressure, P, } = \frac{\left(\frac{(12 \times 20) + (29.798 \times 80)}{3} + 5\right)}{12.566}$$

$$\text{Worked out, } 240 + 2383.84 = \frac{2623.84}{3} =$$

$$874.61 + 5 = \frac{879.61}{12.566} = 70 \text{ pounds pressure.}$$

The weight of the lever $\left(\frac{w \times g}{l}\right)$ may also be obtained by directly weighing the lever pressure, which can be done by fastening a wire around it at the point where the valve pin touches the lever, and lifting the lever with a spring balance and estimating the weight of the valve and pin; or if the valve pin has a yoke, and is also attached to the valve, the whole may be weighed by attaching a wire loop to the top of the yoke, and its value substituted for $\left(V + \frac{w \times g}{3}\right)$ in the formula.

With the trade safety valves that have notches on the lever, measured and cut to the exact distance of the fulcrum from the pin between each notch, and provided with a ball of known weight, as shown in Fig. 2, using the same notation as above, the formula becomes:

$$\text{Pressure, P, } = \frac{W}{A} \times \text{number of notches} + \frac{\left(V + \frac{w \times g}{3}\right)}{A}$$

Substituting the figures for a 2-inch safety valve with notches 2 inches apart, assumed weight of lever 10 pounds, length 16 inches, weight of valve and pin 2 pounds, ball 36 pounds, area of valve as per table, 3.14 square inches, ball on sixth notch. Then,

$$\text{Pressure, P, } = \frac{36}{3.14} \times 6 + \frac{\left(2 + \frac{10 \times 8}{2}\right)}{3.14}$$

$$\frac{80}{2} = 40 + 2 = \frac{42}{3.14} = 13.37$$

$$\text{Reducing, } \frac{36}{3.14} = 11.465$$

$$6$$

$$68.790$$

$$13.37$$

$$82.16 \text{ pounds,}$$

the pressure at which the valve will blow off.

In safety valves having a taper lever, the distance from the fulcrum to the center of gravity may be measured from a fulcrum, when the lever is exactly balanced on a knife edge.

Safety valves should be set at from 5 to 10 per cent. pressure above the regular allowed working pressure of the boiler, in order that they may always give reliable and timely signals when steam is rising from any cause above the assigned pressure. A practice much in vogue among engineers and firemen is to set the safety valve at a much higher figure than here advised to prevent the telltale nuisance resulting from careless firing. When safety valves that are set at the proper pressure blow, and do not seat themselves tightly as the steam falls to normal pressure, it is a sign that there is too much friction in the moving parts, or that the fulcrum and valve pin bearings are not a line parallel with the lever, or that the seat of the valve has a too wide bearing.

In this case there is no excuse for overloading the safety valve by extending the weight, or hanging old iron on the lever, when a gentle pull on the lever with a hooked rod will bring it to its seat; at the first opportunity it should be examined and defects corrected. In no case should a lanyard be attached to the lever for the purpose of closing the valve—but with safety valves in inaccessible places, a lanyard may be attached for opening the valve only. Such a lanyard is sometimes used to close a tardy valve by bumping the valve with a jerk of the lanyard; this should be avoided, or used with the greatest caution; too much jerk might bring disaster. Never put a wedge under the guide yoke to stop the nuisance of blowing off; you may blow up before you are ready.

The Shenandoah Rolling Mill.

It is well known the development of the iron manufacturing industries of the new South has been largely confined to the erection of blast furnaces, and the progress of the manufacture of wrought iron has not in any sense been commensurate with the increase in facilities for making pig iron. This, of course, could, under the existing conditions, hardly be otherwise; but it is an undoubted fact that with an increasing population, and consequent extension of railroad systems, the business of the new South will steadily advance until the home consumption of finished iron and steel will more nearly equal the production of pig iron. The nearer the realization of such conditions the greater the prosperity of the country in general.

With these considerations in view the Shenandoah Furnace Company of Shenandoah, Va., decided to erect a rolling mill plant for the manufacture of muck and bar iron. The plant is so symmetrically arranged and so complete in its detail that a brief description will doubtless be of interest to our readers. The officers of the company are D. W. Flickwir, president, and H. Winston, secretary and treasurer. The plant was designed by and erected under the supervision of Frank C. Roberts, C. E., of Philadelphia, Pa.

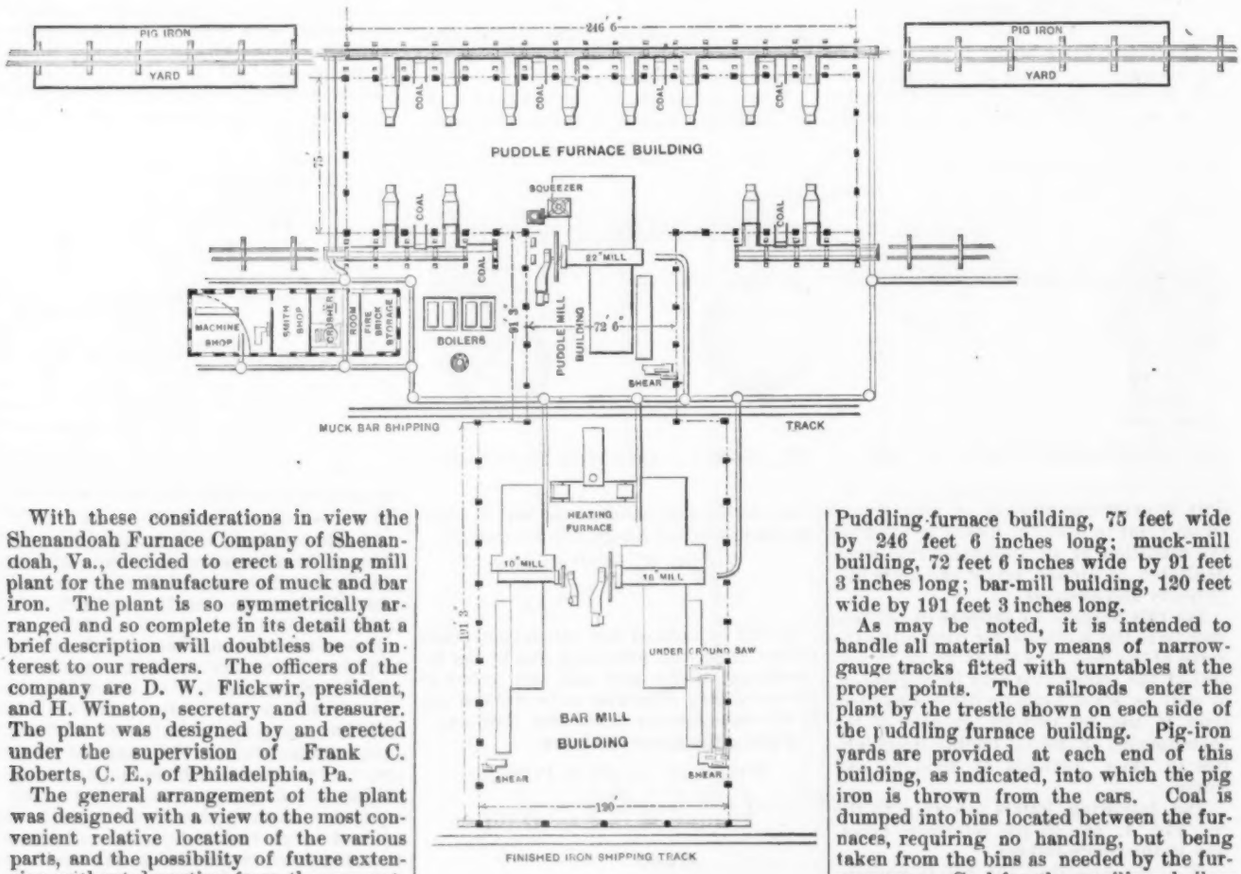
The general arrangement of the plant was designed with a view to the most convenient relative location of the various parts, and the possibility of future extension without departing from the symmetrical and convenient arrangement adopted. The accompanying illustration shows the general plan of the works. It should be noted that all the main portions of the plant are symmetrical with regard to the center line through the muck-mill building. The puddling furnaces are relatively nearly equidistant from the squeezer, the muck mill is central with regard to the bar mills. This arrangement permits symmetrical extension of the puddling department, while the building of other finishing mills on each side of the bar-mill building, will maintain the finishing department symmetrical with reference to the muck mill.

Raw material is delivered to the upper side of the puddling-furnance building, and as the various stages of manufacture are completed, the product is carried forward in one direction until as finished material it is loaded at the shipping track located at the foot of the bar-mill building, as indicated. For the shipment of muck bar a track is provided at the upper end of the bar-mill building.

The puddling plant consists of 12 double furnaces, each being equipped, overhead, with a return tubular boilor 54-inches in diameter by 18 feet long, pierced by 18 flues 6 inches in diameter. The furnaces are arranged for both natural and forced draft, but for the present, the intention is to use natural draft only. The squeezer is designed for the delivery of an 8-inch bloom, being operated by an independent engine 20 x 20 inches.

The muck mill is a two-stand, three-high, 22-inch train, driven by a 30 x 48 inch engine. The muck shear is driven independently by a 9 x 12 inch engine. An overhead traveling crane is provided over the roll train to facilitate the changing of rolls, &c.

The heating furnace is of the Stubblebine type, equipped with an overhead boiler 60 inches in diameter and 20 feet long, pierced by two flues 18 inches in diameter. Only one furnace is provided at present.



Plan of the Shenandoah Rolling Mill.

The bar-mill department consists of an 18 inch and 10 inch three-high train, the former containing two stands and the latter four stands of rolls. Each mill is operated by an independent engine, that attached to the 18-inch mill being 30 x 48 inches, and that connected to the 10-inch mill being 20 x 24 inches. Cooling beds are provided for each mill, and the shears are operated by independent engines. The shear engine for the 18-inch mill also operates the underground saw used in connection with this mill and indicated on the plan. To simplify the handling of rolls a traveling crane is provided over the bar mills. Storage room for finished material is provided at the foot of the bar-mill building. The shipping track at this point is depressed so as to bring the floor of the car about on a level with the mill floor. In order to render possible the running of the bar mill while the muck department is idle, 500 horse-power of auxiliary water tube boilers are provided.

Attention is called to the facilities for storing rolls furnished by means of roll pits located in front of each train and covered with floor plates, the rolls being transferred to or from these pits by means of the traveling cranes.

The machine shop is equipped with a 32-inch roll lathe. For handling rolls in the shop a jib crane is located in the corner of the room covering in its range two-thirds of the floor space. The blower for the Stubblebine furnace and the engine for operating the machinery in the building are also placed in this room. The blacksmith shop is located next the machine shop and is fully equipped, while in the adjoining room is located the crusher and pulverizing mill. The next apartment of the building is intended for the storage of brick, clay, &c.

The puddling furnace, muck-mill and bar-mill buildings are all constructed of iron and are of the following dimensions:

Puddling-furnace building, 75 feet wide by 246 feet 6 inches long; muck-mill building, 72 feet 6 inches wide by 91 feet 3 inches long; bar-mill building, 120 feet wide by 191 feet 3 inches long.

As may be noted, it is intended to handle all material by means of narrow-gauge tracks fitted with turntables at the proper points. The railroads enter the plant by the trestle shown on each side of the puddling furnace building. Pig-iron yards are provided at each end of this building, as indicated, into which the pig iron is thrown from the cars. Coal is dumped into bins located between the furnaces, requiring no handling, but being taken from the bins as needed by the furnace men. Coal for the auxiliary boilers is dumped into similar bins near them, while the ore required for fix, clay, brick, &c., is delivered to the crusher room on the same trestle. The pig iron, after being weighed, is transferred by means of the narrow-gauge system running directly under the railroad trestle to each furnace, and the same system of track is used for carrying away the cinder and ashes from and for supplying fix, fire brick and clay to the puddle and heating furnaces. The narrow-gauge system is also used for transferring rolls to and from the machine shop, and for distributing muck bar along the storage yard. The water supply is taken from the Shenandoah River. Feed-water heaters are provided, and the steam and water piping is made as complete as possible.

The muck mill, squeezer and muck shears were furnished by the Robinson-Rea Mfg. Company of Pittsburgh; while the bar mills, with accompanying shears, were supplied by the Lloyd-Booth Company of Youngstown, Ohio. The mill engines are of the make of W. Tod & Co. of Youngstown, Ohio.

STEAM BOILERS.*

BY JOHN J. HOGAN.

From the time when it was discovered that steam used expansively was capable of propelling a piston in a cylinder, direction was given to all the future improvements in the design and construction of steam engines. The functions of the inlet and exhaust valves to a steam cylinder are known. The advantages of the steam jacket around a steam cylinder are apparent, and the production of a vacuum to receive the expanded steam is readily accomplished. It is also demonstrated that the higher the pressure and temperature of the steam entering a cylinder, the greater will be the range of its expansion, and the more economical will be the results. The designer of a steam engine has therefore to provide for the introduction of the steam into the cylinder at as high a pressure as can be obtained. He will prevent as far as possible any loss of temperature—that is, pressure—except the loss due to useful work in the propulsion of the piston. The steam will be expanded down to the lowest pressure giving useful effect before it is discharged into the condenser or atmosphere. With such definite work to be done, it is not a matter of much surprise to see the great developments and improvements in the mechanical design and construction of steam engines in recent years. The steam engine designer receives the steam and provides for its use. The boiler designer projects an appliance with which it is proposed to produce steam, but the boiler designer, unlike the steam engine designer, has little definite matter on which to base the design of his mechanical construction.

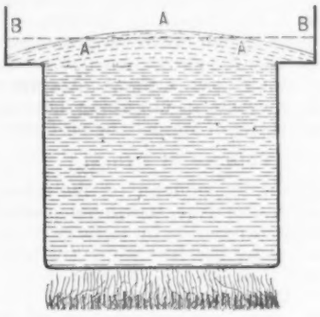


Fig. 1.—Diagram of Vessel.—Impeded Circulation.

Points to be Considered in Designing Steam Boilers.

In the production of steam fuel and water are necessities, and they have to be considered conjointly when discussing the advantages or defects in the design of steam producers, and the improvements which have taken place and are possible in the construction of steam boilers.

1. Combustion is provided for by arrangements for the admission of the proper quantity of air and its mixture with the gases of the fuel. If more air than is necessary for the proper combustion is admitted, especially at a low temperature relatively, the effectiveness of combustion as a means of producing heat is greatly reduced.

2. Heat when produced is absorbed through the surfaces of the vessel which incloses the water. These surfaces are arranged and are of such extent that they take up a proportion of the heat from the gases before the latter pass away from them.

3. If the heat of the gases is apparently absorbed by the water before they have passed from the boiler the velocity of the natural draft in the chimney is impaired, the supply of air to the ignited fuel is reduced and combustion injuriously affected.

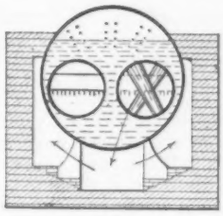
4. The arrangement of the water surfaces presented to the heated gases entails a consideration of the effect, beneficial or otherwise, which such surfaces have on the absorption of heat externally and the circulation of water internally, and the structural strength of the surfaces to withstand the internal pressure.

5. The introduction of the water into the boiler, which is converted into steam as rapidly as it enters, as well as the condition of the steam when it leaves the boiler.

These are the chief points to be considered in designing the steam boiler.

Improvements in Methods of Construction.

Although the interesting subjects of the production of heat and the circulation of water are directly connected with their design, boilers have not received the same attention as engines, apparently because the steam boiler to many, as a mechanical



Lancashire Boiler.—Fig. 2.—Transverse Section.

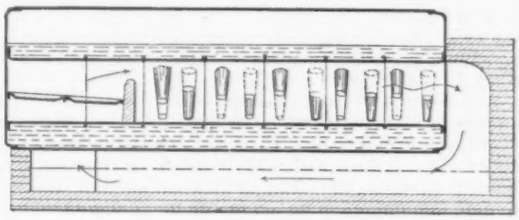
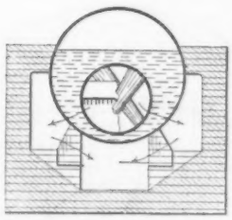


Fig. 3.—Longitudinal Section.



Cornish Boiler.—Fig. 4.—Transverse Section.

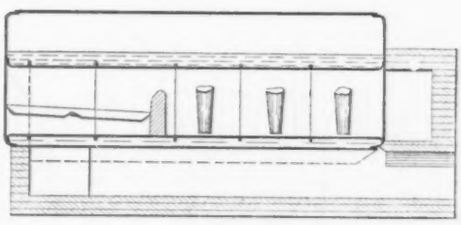
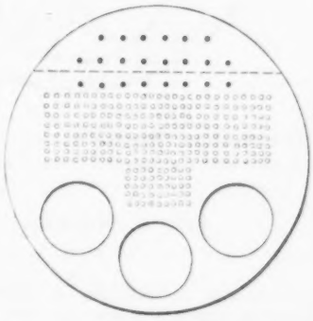


Fig. 5.—Longitudinal Section.



Marine Boiler.—Fig. 6.—End View.

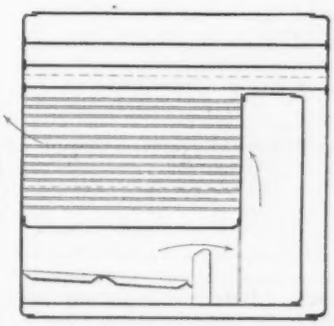
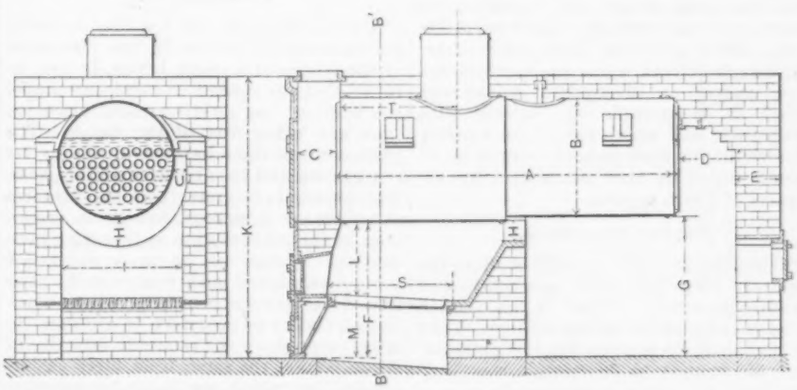


Fig. 7.—Longitudinal Section.



Horizontal Multitubular Boiler.—Fig. 8.—Transverse Section, Showing Tubes in Vertical Rows.

Fig. 9.—Longitudinal Section.

STEAM BOILERS.

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appliance, is less fascinating and interesting than the steam engine. This may partially account for the little variety and few improvements in the principles of design of boilers that have appeared during the last half century. It cannot, however, be denied that during that time great improvement and progress have been made in the manner and methods of construction. Twenty-five years ago it was difficult to get a plate of 800 pounds weight without defects, laminations, &c. To-day plates of any desired thickness, weight or quality in steel or iron may be readily obtained. Tubes of steel or iron as desired are obtainable with little difficulty. The improvement in plate-bending machinery is also recognized. In good work the punch and shears are replaced by the drilling and plate planing machines. Hand riveting is used where necessary. Hydraulic and steam riveting machines draw the heavy plates together. Calking is done with improved tools. Flanging machinery makes smooth and uniform work without irregular heats. The drift is not used and the reamer is not required because of the exactitude in the laying out of the work. Here are important improvements in the material and appliances used in the construction of boilers. Yet it is true to say that the greater part of these improvements are used generally in continuing the existence of defects in design. Little effort has been made to remove such defects, while no exertion has been spared to strengthen weaknesses which it is possible to dispense with altogether; and which should be entirely removed if the high pressure is to be maintained which is now demanded by designers of steam engines.

Higher Pressures.

The pressure used in engines from the time of Watt has been gradually and steadily increasing. First it was from 3 pounds to 7 pounds per square inch. Then 20 pounds to 25 pounds was low pressure, and 45 pounds to 50 pounds was high pressure; 75 pounds to 80 pounds only a few years ago was high pressure; it may now be considered low pressure; 110 pounds to 130 pounds pressure is common; 150 pounds pressure may be said to be usual; 175 pounds to 200 pounds is not infrequent, while pressures from 200 pounds to 300 pounds are even at present in use. But to carry these pressures the same types or designs of boilers which were used a short time since to carry 50 pounds to 80 pounds pressure are perpetuated. The plates in the shells have been increased in thickness, the number of rivets has been increased, and sometimes larger ones are used. The material in stays has been added. Headers or manifolds have been made thicker and of better material. The manner of making joints has been improved, and wherever metal to metal is possible it is retained without the use of washers.

No Effort to Improve Circulation.

But in no instance has any effort been made to improve the circulation of the water, which was bad when low pressures and temperatures were used, and which becomes relatively worse when high pressures and temperatures are adopted. The manner of introducing the feed water has not been changed. The result of all this is that with bad circulation and bad water boilers of heavy materials working under high pressures and high temperatures are subject to some very severe and dangerous strains. When any breakage occurs from such strain it is usual to conclude that the part is weak, and the addition of more material is the remedy. Improvements in methods of construction, therefore, are often used for the continuance of defective design.

Combustion.

Taking the first of the five essential points for consideration in the discussion of the design of a steam boiler, it will be found that the manner of obtaining proper combustion has received more attention than any other part of the boiler. The grate controls the admission of the air for combustion and its mixture with the gases. Improvements in grates and the furnaces of boilers are numerous, and great economies in the consumption of fuel have been attained by the use of those which are properly designed and constructed. The size of the grate is controlled by the quantity of fuel it is necessary to consume in order to produce the required quantity of steam, and at the same time meet any irregularities which are liable to occur in practice in the supply of fuel.

Absorption of Heat.

The absorption of heat by the surfaces of the vessel which contains the water depends on their location relatively to the grate, the freedom provided for the motion of the water within them, and their extent. The location as well as the form of the surfaces affect their efficiency for taking up heat. Surfaces directly subjected to the radiant heat of the fire are more effective than those with which the heated gases only come in contact. Surfaces within which the water can circulate freely absorb heat more rapidly than those surfaces that inclose large and almost motionless bodies of water. The capacity or volume of the water spaces within the absorbing surfaces should be sufficient to maintain the temperature of the water so that the pressure will not be affected when renewing a portion of the fuel or by accidental admission of cold air, which may occur in practice. Yet this volume should not be large enough to interfere with the circulation of the water. The extent of the surfaces depends on their effectiveness in absorbing heat and on the quantity of steam to be produced.

Volume of Flues.

The areas or volumes of the flues or combustion chambers, which are partially or entirely surrounded by surfaces in contact with water and into which the heated gases pass from the fire, affect the temperature of the gases in contact with such surfaces. The low temperature of the gases which are about to pass into the chimney does not always indicate that the heat of these gases has been used up usefully. The space or capacity in the flues for the passage of the gases can be too small, and such reduction of area tends to check the incoming of the necessary air at the grate to produce the combustion of the gases at high temperatures. On account of these reduced areas the ignited gases are extinguished on entering the small flues and they pass as it were through a "process of wire drawing or attenuation" before they reach the chimney. These flues should, therefore, be proportioned relative to the amount of fuel burned per square foot of grate and their length. The area may vary from one-sixth to one-third of that of the grate, dependent on the position of the flues.

Surfaces in Contact with Water.

The arrangement of the surfaces in contact with the water in a steam boiler is of the greatest importance. On it depends the most essential element involved in the design of a boiler—namely, the absorption of heat by the water. The circulation of water is due to the difference in weight of two columns or currents of water. By the application of heat a difference in temperature between the two columns of water is produced. The equilibrium is then de-

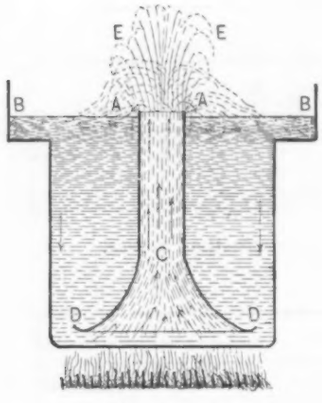
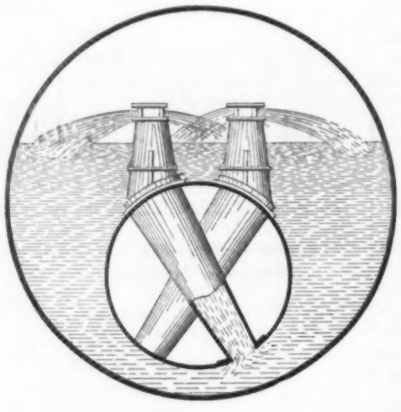


Fig. 10.—Diagram of Vessel.—Assisted Circulation.



Low Pressure Marine Boilers.—Fig. 11.—Cornish Boiler with Gamgee Spouting Cowls on Cross Tubes.

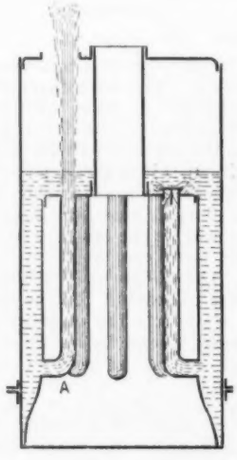


Fig. 12—Davey Paxman Boiler—English Practice.

STEAM BOILERS.

stroyed and motion takes place. The velocity of this motion is accelerated by increase in the difference of the temperatures of the two currents, as well as by increase in the hight of the columns; the result is rapid circulation. The hight of the columns measures from the level of the top of the water down to the point at which heat is first applied. Water lower than this point, when not in the actual circuit of the moving currents, receives heat by conduction. The rapidity of circulation is decreased by a reduction in the hight of the columns and by a reduction in the difference of the temperatures of the ascending and descending currents. Circulation is also impeded by the deviation of either of the currents from a vertical course. Each change of direction, be it inclined or horizontal, is an impediment to free circulation. Where changes of direction to the ascending currents are numerous, increased velocity produces greater frictional resistance in the passages. The intermingling of currents of relatively low temperature with the ascending currents, and of high-temperature currents with the descending currents, impairs circulation by tending to re-establish a condition of equilibrium. When the two columns attain the same temperatures circulation ceases. This equalization of temperatures is more liable to occur when circulation is promoted under high pressures—say 150 to 250 pounds per square inch (the temperatures being respectively 358° and 400° F.)—than at pressures of 50 to 80 pounds (with temperatures of 280° to 311° F.), the boiler being the same in all cases.

Law of Circulation.

The effect of circulation and the application of its law to steam boilers will be more readily understood by an examination of the accompanying sketches. Fig. 1 represents a vessel with water when cold at the level B B. When the bottom of the vessel is heated the ascending or light currents pass toward the center of the vessel in an irregular way, while the descending currents pass down near the sides. As ebullition goes on the surface of the water takes a form similar to A A A. First globules of air and then of steam rise to the surface, the steam globules become larger and the velocity of their ascent increases. By continuing to raise the temperature still larger globules of steam are formed and water is converted into steam more rapidly than it can ascend through the water above it; circulation is no longer sufficient to displace the steam, and therefore it forms beneath the body of water, and its energy is exerted in irregularly throwing the mass of water upward. This is called "boiling over" in small vessels and "priming" in steam boilers. This "priming" occurs as just described in Lancashire and Cornish boilers, Figs. 2 to 5, and in marine and horizontal tubular boilers, Figs. 6 to 9.

Assisted Circulation.

Fig. 10 represents a vessel similar to that shown in Fig. 1. A vertical tube, C, with an extended base is placed in the vessel a little above the bottom and with a space, D D, all round. The surface of the water when cold is at the level B B, the tube C extending a little above it. When the bottom of the vessel is heated ascending and descending currents form first in the tube C until the water in it expands and overflows at A A. Circulation continues with all ascending currents rising in C and the descending currents falling along the sides of the vessel to D D. As the temperature of the fire increases steam globules continue to ascend rapidly in C to A A. The globules increase in such quantity and with such rapidity of production that steam carrying some water with it is forced out of C to E E, where, the steam separates freely from the water, which falls back into the vessel. In this case the circulation due to gravity has not been interrupted by the too rapid production of steam, as would occur under the conditions shown in Fig. 1. The temperature of each globule of steam is practically maintained as it was acquired until discharged or given off. In its ascent it came in contact with no currents of a lower temperature.

Spouting Cowls.

The effect of this kind of circulation is demonstrated in practice by reference to Fig. 11, which shows the Gamgee spouting cowls on the cross tubes of a Cornish boiler and Fig. 12 a Davey Paxman boiler. With circulation assisted by the use of the Gamgee cowls in Lancashire and Cornish boilers a lowering of fuel consumption of from 7 per cent. to 20 per cent. is claimed. Such claims as these serve to show that the types of boilers mentioned as commonly constructed have inadequate circulation. The surface of water from which steam is given off in a Lancashire boiler, for example, is about 180 square feet, while the surface affected by 12 cross tubes to which cowls are applied is only 2¼ square feet, or say one-seventieth of the whole. The inference, then, is plain that the relatively small surface in which the circulation is assisted gives off at least about five times the quantity of steam per square foot than is given off by the usual surface in Lancashire boilers.

It is not intended to convey the idea that steam cannot be made in boilers until such impediments are removed or that the present construction of boilers will not be safe until certain defects are remedied. The object, rather, is to direct attention to the fact that boilers can be designed in which provision for circulation according to natural laws will exist. At present, as is generally admitted, the best practice loses 25 per cent. of the total units of heat in the fuel, while in average practice the common loss is about 50 per cent.

(To be continued.)

Reciprocity With the West Indies.

As a rule New York merchants whose opinions have been obtained do not express themselves with confidence respecting any considerable growth either of exports or imports, as a consequence of reciprocity in our trade with the West Indies. The population of the islands is small, made up in large proportion of negroes, whose wants are few and simple. Flour is the commodity principally in demand, and consumption is necessarily limited in large measure to articles of food. Therefore little difference in the volume of trade could be expected, even though it was possible for the islands to make important concessions in import duties as a recompense for the continuance of free sugar permitted by the United States. It is contended in behalf of the West India governments that duties on food products from the United States constitute the principal dependence for revenue, that they are already fixed at a minimum with all countries, and cannot be abandoned, as other sources of revenue are not available. It is represented, further, that any impediment that might interrupt the business now done would only inure to the benefit of Canada, which is already making special exertions by means of chartered lines of steamers, to divert trade from rivals in the United States. Intimations come from Canada that Premier Abbott will remonstrate with the Imperial Government, as in the case of Newfoundland, against any reciprocity measures with the United States which may tend to discriminate against trade with Great Britain or any of her dependencies.

THE WEEK.

The Hebrew Institute of this city, in the Technical Department, has 45 members and the resources exceed $60,000, exclusive of the institute property.

The American steamship Orion recently made the voyage from Boston to Bristol, England, in less than 12 days, on a consumption of 23 tons of coal a day. Her cargo weighed 2628 tons. It is calculated that a steamer like the Orion could tow three steel barges, carrying an aggregate of 6000 tons, at a speed of 8 knots an hour.

Two oil-tank steamers have been chartered for six months to transport Cuban molasses in bulk to the refineries in Philadelphia.

The plan for the abolition of internal customs duties in the Republic of Mexico, recommended to the Government by a Commission appointed some months ago, proposes to make absolutely free within the boundaries of the Republic the movements of all merchandise, foreign or domestic, after July 1, 1893.

The present extremely low price of cotton is bringing bad results in the South in the form of frequent mercantile failures. The planters find it hard to pay with 7-cent cotton debts contracted in 10-cent cotton times, and the merchants who advanced money to them are in many cases unable to meet their obligations. The worst experience on this subject will be in the early spring when the planters want money with which to purchase supplies for the next crop. Merchants will be unwilling to make advances at present prices.

The annual address delivered before the Illinois State Grange, 8th inst., at Springfield, was full of statistics. Worthy Master Thompson said that during 1890 the average price of wheat in Illinois was 87 cents; that it sold for about $15,000,000, and that the net profit to the wheat growers was about $2,000,000. He also said that the farmers of the State are paying 6 per cent. interest on $146,000,000; that the interest amounts to $7,000,000, and the net profits aggregate only $6,800,000, so that the farmers are losing money.

The total arrival of immigrants in the United States from foreign countries, other than British North America and Mexico, during the year ending June 30, 1891, amounted to 560,319, against 455,302 during the preceding fiscal year, an increase of 105,017. The following table shows the number and nationalities of immigrants arrived in the United States during the years ending June 30, 1890 and 1891:

From	1890.	1891.
England	57,020	53,600
Ireland	54,024	55,706
Scotland	12,041	12,557
Great Britain, other	669	448
Total Great Britain and Ireland	122,754	122,311
Germany	92,427	113,554
Italy	52,003	76,055
Russia and Poland	46,671	74,923
Austria-Hungary	56,199	71,042
Sweden and Norway	41,002	49,448
Other Europe	32,169	36,652
China	1,716	2,836
All other countries	10,361	13,498
Total	455,302	560,319

The Farmers' Alliance are said to contemplate a corner in cotton, similar to that proposed for the wheat market early in the season. They assume to have information that the new crop is only about 6,800,000 bales, instead of upward of 8,000,000 bales, as commonly believed, and this despite the fact that upwards of 5,000,000 bales are actually "in sight," an amount that ordinarily is accepted as representing at this season about one half of the aggregate. The assumption argues that planters have hastened to market

their crop, undeterred by the prevalence of lower prices than were ever before known, at least within the last 30 years. The farmers may "bite off more than they can chew."

The creosote works of Eppinger & Russell, in Long Island City, the largest in the country, were burned on the 10th inst. Superintendent Valentine places the loss of the company at $50,000, which is mainly in specially constructed machinery and 18 miles of coiled pipe. The loss is fully covered by insurance.

Travel over the New York and Brooklyn Bridge continues to increase. In the last 12 months the receipts from tolls were $1,176,447, an excess of nearly $50,000 over those of the previous year. The number of passengers carried was 41,000,000. The highest number carried in a single day was 151,554. The proposed addition to the cable-driving plant will allow four cables to be placed on the railway, of which two at all times will be ready for use, and the machinery in all its parts will be in duplicate.

The value of wheat and flour exports this year up to a recent date was $14,000,000, or nearly double the amount of the previous year for an equal period.

The first seamless steel boat was finished at Wakefield, England, last month. The boat is 15 feet long, 4 feet beam, weighs 3¼ hundredweight and will carry six persons. It was made from a single piece of steel, compressed into form by powerful hydraulic machinery.

Since 1872 the military expenditure of the German Empire has amounted to 12 milliard marks (£600,000,000) in round figures, exclusive of the large expenditure for military railways and other objects. While feeling the present blighted condition of business, the people are disposed to criticise this heavy expenditure.

Newspapers in the lake cities agree in urging that an early date be fixed upon for the annual closing of navigation, on account of the frequency of disasters at this season of the year. No consideration of profits can justify the risk that those assume who make the late voyages.

The magnificent structure of the Drexel Institute of Art, Science and Industry in Philadelphia has been completed at a cost of $600,000 and will be formally dedicated on the 17th inst. The central court is a leading feature. At the farther end of the court is the double marble stairway ascending to the upper stories and descending to the auditorium and to the workshops in the basement. Arcades support and inclose the broad galleries which run around the court on the second and third floors. From these galleries open the class rooms, laboratories and studies, all of which are lighted from the exterior of the building. The workshops and studies are in the basement.

Rumors gain currency in various directions that the Argentine Confederation and Chili are on the verge of hostilities. The Krupp Gun Company, in Germany, profess to have information to this effect and a letter from Buenos Ayres to a London journal, from a regular correspondent, refers to the recent sessions of the Chamber of Deputies while the estimates for war and marine were under discussion. Despite severe penalties to which the press is liable for violation of secrecy, it is known that the army, nominally 6000 strong, is to be almost doubled, new ironclads are to be bought and large supplies of war material are to be procured. The writer says: "For a long time past there has existed a smothered apprehension in the public mind that a foreign war is another trial in store for the country at no distant date." The increased expenditure involved for the present is said to be about 5,000,000 of paper dollars. The new bank of the Argentine Nation opened its doors to the public on the 9th ult. with 50,000,000 of inconvertible notes.

In the Maine shipyards there have been built this year 134 vessels of various kinds, including steamers, schooners and sloops, and the shipyards on our Western lakes, as well as on our seaboard, are busy this winter, and whalebacks are built at West Superior, and steamships are built at Cleveland and other places; and from Maine to Oregon the shipbuilders are laying keels.

Northern Mexico is purchasing corn in the United States.

The fact that freight charters at San Francisco have dropped from £2. 5/ to £1. 10/ per ton, owing to the free arrivals of tonnage, forbids the hope of large profits which shipowners looked for early in the season.

The New Zealand Shipping Company are building a vessel of 6300 tons, designed to carry 70,000 carcasses of frozen sheep.

The entire property of the National Lead Trust has been transferred to the National Lead Company, a corporation organized under the laws of New Jersey, with a capital of $30,000,000, divided into $15,000,000 preferred and $15,000,000 common stock. The motion of one of the holders of Lead Trust certificates to enjoin the organization, which was argued on October 29 last, and which has been under advisement since, has been denied by Judge Ingraham, with costs.

The whaling fleet sent out from San Francisco between November 22, 1890, and March 25, 1891, consisted of 42 vessels, of which 8 were steamers. The fleet arriving brought 12,125 barrels of oil and 220,650 pounds bone.

The trade treaties with several European governments recently negotiated by Germany are almost unanimously approved by the Reichstag and are supposed to have for their ultimate object the isolation of France and Russia. Interstate tariffs are abolished and a practically free zone established by a triple alliance, to which Belgium and Switzerland are admitted and Spain is expected to follow. On the Bourse at Berlin the opinion is general that the conventions will have little effect upon the general aspect of business for a long time to come. The term zollverein, as applied to the treaties, is considered a thorough misnomer. Each of the five States contracting, while making some concessions, retains a string of heavy duties against the others. The value of the measures can only be shown by time. The new tariffs, when announced, hardly caused a momentary throb on the Bourse.

An explosion at Carnegie's Lucy Furnace last week killed one man and injured several, but the furnace itself was not harmed.

Locomotive engines to the value of $2,802,000 were exported from the United States during the last two months, showing a rapid increase in the foreign demand

Under the homestead and pre-emption laws 114,000 patents were issued last year for an aggregate of 18,297,000 acres. That means over 100,000 new homes located in the wilderness in a twelvemonth.

The Federal census gives New Orleans a population of 242,000.

A variety of iron implements made by the Fan tribe in equatorial Africa has been presented to the University of Pennsylvania. The collection shows a considerable degree of civilization and high mechanical skill, especially in metal work. Native iron, it seems, is plentiful, lies near the surface and is smelted by simply building a fire over the exposed ore. A very queer-looking bellows is used and is said to be effective. The iron hammers weigh about 25 pounds, but the anvils, strange to say, are of stone.

The awarding of a contract for new boiler shops by the William Cramp & Sons Ship and Engine Company to a concern in Connecticut presents a peculiar phase of the iron industry. These two shops, one of which will be 350 feet long by 55 feet wide, and the other 370 feet long and 58 feet wide, are to be constructed in Connecticut by a concern that does not manufacture structural iron or steel of any kind. Most of the material to be used will probably be made in Pittsburgh and shipped to Connecticut for fitting.

The Chicago Elevated Terminal Railway Company have purchased for $7,500,000 the right of way and all the real estate holdings of the Atchison, Topeka and Santa Fé Railroad within the city limits. The company propose to furnish elevated terminal facilities for a number of roads entering the city from the South and West.

A remarkable proof of the changes that are taking place in the shipping trade was recently afforded at Liverpool, when, at an auction sale, the best offer that could be got for the City of Richmond, once a "crack" ship of the Inman fleet, was $33,000. The ship originally cost about $750,000. Triple-expansion engines and twin-screw steamers quickly supersede old styles. This explains why, despite the excessive supplies of tonnage, shipyards in the United Kingdom are building more vessels than a year ago.

Imports of machinery make a large item in trade. For ten months, ending October 31, the value of machinery imported into the United States was $2,673,000, as compared with $2,212,000 for the corresponding period last year. To avoid paying imports on manufactured goods, it occasionally happens that the entire establishment is transferred across the ocean.

A member of the Naval Board recommends the construction of double-end steel screw steamers, similar to the improved North River ferry boats, for service in shallow water.

Commissioner of Navigation Bates, speaking of the comparative durability of American and British built vessels, of all kinds, says results prove in almost all points, the American shipyard excels the British in its productions.

Imports of cutlery for ten months, ending October 31, were valued at only $834,000, against $2,248,000 during the same time in 1890. Imports of fire arms fell off over one-half, to $601,897; anvils and chains about one-third.

The State Department has made public the reciprocity agreement entered into with Germany, whereby the sugar from that country secures free admission into the United State, and American products named obtain admission into Germany at reduced rates. The tables show a reduction of German import duties on wheat of 30 per cent.; rye, 30 per cent.; oats, 47½ per cent.; corn, 20 per cent.; butter, 15 per cent.; sausage, pickles, pork and beef, 15 per cent., and wheat flour and corn meal, 30 per cent. This agreement was submitted to the German Reichstag on the 7th inst., and, if approved by that body, will go into effect February 1.

There are nearly 50,000 wells in Pennsylvania producing about 61,000 barrels of oil daily, and it is calculated that only about 2000 of the whole number are now running at a profit, the present price of oil being $1.

The Iron Age

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DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - - BUSINESS MANAGER.

At the Head of the Lakes.

The people who have cast their fortunes into the current of events at the west end of Lake Superior are credited with rather more than the average amount of pride in their local advantages. It is, indeed, the general impression that a Duluth or West Superior man is a "boomer" of the rankest type. Those who are prejudiced by such a feeling against seeking to know something about the progress made there are, however, making a serious mistake. Chicago passed through just such an experience in its short but very eventful history. It became known as the Windy City, because every Chicago man seemed never weary of "blowing" about what his city was doing. Time has realized the predictions, and in numerous cases far surpasses the prophecies of the early Chicago "boomers," and now the old term of reproach, which once had a sharp sting in it, is heard by the Chicago people with perfect serenity. There are numerous persons living who would have profited greatly if they had not acquired a prejudice against Chicago, which without investigation was permitted to keep them from participating in the golden opportunities enjoyed there for years. Those who decry the advantages of a location at the head of Lake Superior without giving the matter careful personal investigation are liable to the commission of a similar error.

Very few localities in this country are now growing more rapidly in population and manufacturing and commercial enterprises than the district bordering on the harbor of Duluth. The natural advantages of its location at the extreme western end of lake navigation have long been seen, but time was required for the multiplication of railroad facilities to that point as well as for the filling up "back country" with settlers. The start has been made in such good shape, however, that it is not surprising that business at Duluth and West Superior grows by "leaps and bounds." The great wheat producing section of the country is now the extreme Northwest, and of this section a Lake Superior port is the natural outlet. The iron ore mines of Minnesota also meet lake navigation not far from the harbor of Duluth, and a new iron range to be developed the coming year will probably ship from docks at Duluth itself. It is to be expected that wheat and ore shipments will grow steadily from year to year without a particle of danger that the trade can ever be diverted wholesale to another locality. There is no port further west, and the diversion of Canadian shipments of wheat to a port on the north shore of Lake Superior would take but a limited part of its trade.

The manufacturing advantages of the head of the lakes are greater than would be supposed. There is no coal field within easy reach of this locality, but the freight on coal from lower lake ports is so nearly nominal that the fuel question is no sort of a problem whatever. Return cargoes are in such demand by ore and grain carriers that 25 cents per ton is the usual estimated cost from Lake Erie ports to Duluth and West Superior docks, and the past summer more than one cargo of coal was carried for only 10 cents. As west-bound lake business will not for very many years, if ever, approach the volume of east-bound business, the prospect of dear coal is remote. Proximity to the rich ores of the Lake Superior district and the cheapness of fuel would seem to make this a good location for blast furnaces and steel works. The pioneers in this line are just getting into operation, and developments will be carefully watched by numerous interested parties. Important enterprises are known to be in contemplation, which will be put in effect as soon as these pioneers have demonstrated the success of their location.

The manufacturing interests of the locality are already remarkably varied. Duluth possesses immense car shops, which were clouded with financial trouble shortly after they started, but are now gradually getting into proper shape; a blast furnace, but recently blown in, and now making the first coke pig iron at the head of the lake; saw mills reputed to be among the largest and best equipped in the world; flour mills of great capacity and the most modern type of machinery; a wagon factory, already of large proportions, and projected on a scale which will eventually make it one of the largest institutions of the kind in the country; foundries and machine shops, removed here from other localities, but supplied with far greater facilities than they had previously enjoyed; refrigerator works of large capacity, in which the native hardwoods are worked up into merchantable form and shipped all over the country. West Superior has one of the largest steel shipyards on the lakes, making a specialty of "whalebacks," which have probably excited greater interest in marine circles throughout the world than anything else occurring in the line of naval architecture for 30 years; Bessemer steel works and plate and structural mills, forming the most important iron and steel plant north of Milwaukee; the only pipe foundry in the Northwest; a stove foundry of very considerable dimensions, and a number of less important enterprises. A dry dock capable of handling the largest vessel on the lakes is now in course of construction at West Superior, which will be an inestimable convenience to shipowners, as the nearest dry dock is now at Saginaw, Mich., on Lake Huron. The manufacturing interests of the locality are greatly assisted by a complete terminal system, operated jointly by all the railroads and making very reasonable charges for transfers from one road to another.

The water power of the St. Louis River, within a few miles of Duluth, is one of the greatest on the continent. Arrangements are now being made to put in the first dam, to begin to utilize this vast force so long running to waste. With the great advances which have been made of late years in the transmission of energy over considerable distances, it is expected that the St. Louis water power will be used for a great many purposes at points scattered along the St. Louis valley.

Trade Questions in Canada.

Parties in the Dominion are distinctly divided on the question of reciprocity with the United States, and the separation between them becomes wider continually. Since the Liberal defeat at a general election the policy of a trade alliance with the United States, it is charged by the Tories, is undergoing a reconstruction. Those who then favored restricted reciprocity, it would now appear are willing to break down all barriers, adopt a common tariff along the seaboard and to discriminate against British goods. At least a recognized organ of the Liberals, the Toronto *Globe*, frankly declares: "To secure free trade with the United States, for no limited measure is available under existing circumstances, it will be necessary for us to discriminate against British goods." And a leading public man in the Dominion while recently in Boston openly avowed that the Liberal policy contemplates a common tariff with the United States as the price of admission to the American market. Organs of the Dominion Ministry affirm that this is the true attitude of the opposition and that "a common tariff dictated from Washington" is the ultimatum which the Liberals would force upon the acceptance of the country. Thus they would cover their opponents with odium and at the same time show that neither the Imperial Government nor the United States would assent to the arrangement. On the one hand Great Britain would not sanction discrimination against British trade, implied in such an alliance as that proposed, and Americans would not "run the risk either of having British wares pass free into their markets under the guise of Canadian products, or of having Canada made the base of manufacture of many products of which England can supply the raw or half-finished material."

The Canadians have a knotty problem before them, liable to involve much acrimony of debate, if not more serious consequences affecting their commercial and political status. The drift of discussion is toward the question of annexation, pure and simple, and yet it is easy to believe that the time when Canada will be ready to sacrifice her commercial independence is a long way off.

A subject of more immediate interest to the United States is the retaliatory war

between Newfoundland and the Dominion Government, growing out of the efforts of the former to enter into reciprocal trade relations with the Government at Washington. Through the intervention of Premier Abbott the scheme was thwarted. Newfoundland promptly retaliated by refusing Canada the privilege of obtaining bait fish in the waters of that colony, while rival fishermen from the United States enjoyed every advantage. The Dominion, to punish such audacity, responded by imposing a duty on fish and fish oils, previously admitted free. The next step on the part of Newfoundland was to impose a special extra duty on Canadian flour, pork, butter and other products of agriculture. Canadians, on the one hand, lament the loss of an export trade that last year amounted to $1,200,000, while Newfoundlanders lose a valuable market, and the cost of the necessaries of life will be largely increased.

Recruiting the Engineer Corps, U. S. N.

Geo. W. Melville, Chief of the Bureau of Steam Engineering, U. S. N., in his report, just issued, lays great stress upon the fact that the number of engineer officers is insufficient for the performance of the duties belonging to them. "Unless measures are at once taken to remedy this condition and to stop the steady decrease in numbers, we shall before long have a painful awakening by a serious breakdown or accident on some of our vessels. There is a limit to even a naval engineer's endurance; and while the officers of the Engineer Corps will do their best to make all needed repairs and keep in efficient condition the magnificent machinery of the new vessels, from which the country justly expects so much and in which it takes a proper pride, they can go no further than the limit of their physical strength; when this has been reached the machinery must take care of itself."

The machinery of a modern war vessel is a collection of mechanisms, each composed of many parts, and the whole forming a vast and delicate organism, which may be rendered useless by an accident of seeming unimportance to the non-professional observer. The perfect working of this machine can only be insured by the constant, unremitting and personal attention of an experienced engineer. This cannot now be obtained.

Chief Engineer Melville states that the number of engineer officers should be at least 300, and "even this number will be inadequate unless supplemented by a sufficient number of intelligent and skilled artificers and well-trained firemen." The division into grades should be in accordance with the duty to be performed, and arranged so as to give reasonable promotion, in order to keep the ablest young men in the corps. He would recruit the corps from the Naval Academy and from competent graduates of the great technical schools, under regulations to be formulated by the Department. It is deemed advisable to provide for the selection of an equal number of cadets from the academy and from the technical schools each year to go through a two years' practical course at sea and on shore. This number should be in excess of the probable number of vacancies in the corps at the end of two years, these vacancies to be filled by competitive examination. This would act as an incentive to the candidate and would insure obtaining those best qualified for the duties.

The proposed increase in the number should be made gradually, in order to secure thoroughly good men. Twenty each year would provide for the gradual increase, and at the same time allow for the reduction due to retirements and resignations. The recommendation of the Board of Visitors to the Academy, that the selection of cadets for the engineer division should be made after two years, instead of three, is commended, for the reason that it will enable a course of two years to be pursued in technical studies and practical exercises.

We think one of the most essential points dwelt upon in the report is found in the following remark, "that only those should be taken who have displayed some aptitude for engineering, and who volunteer for that division." It seems absurd to expect that a competent engineer can be made of one having no liking for the profession. "I hold that it is a radical mistake to select young men for the engineer division at the Naval Academy merely to make up the number necessary to fill vacancies, or who are willing to go into it because they think they are thereby certain of securing a commission which they might not otherwise receive."

Naturally following this, it is believed that all who display aptitude for engineering, and who volunteer for the course, should be allowed to take it, no matter where they stand in the class.

A curious feature in shipbuilding at the present time is the reaction that has taken place in favor of sailing vessels. This is most noticeable in England, but even in the Eastern States it is said that a dozen large ships will be built the coming year, indicating a positive revival. Among the reasons given for this change is the introduction of so many mechanical appliances for saving labor, by which the costs of navigation are reduced. It is somewhat surprising, after the many complaints that have been made of the excessive amounts of tonnage afloat, that on October 1 in the United Kingdom more than 750,000 tons were under construction, or over 100,000 tons in excess of the corresponding date in 1890. Of this aggregate 26 per cent. is sailing tonnage, whereas the proportion of this class a year ago was only 12 per cent. It is surmised that the increased cost of coal, caused by labor strikes in the mines during the last summer, affords the most ready explanation of the partial substitution of wind power for steam, particularly on long routes where coal is replenished with difficulty. On the great Northern lakes both sails and steam are dispensed with in a measure by employing steel barges to be taken in tow, and in the Atlantic trade barges are proposed for the transportation of grain, coal, sugar and other commodities. On the Pacific barges will be used for conveying timber. The scheme for towing in "deep water," however, is yet in the experimental stage.

The Chicago car famine has grown to be a very serious matter. A bonus of $20 per car is said to have been offered the past week by grain shippers who had important export contracts to fill. This is the condition of affairs long since predicted by the railroad people themselves, but they asserted their inability to make the necessary preparation for it, with investors refusing to purchase railroad bonds and stocks. For a time after the active movement of grain began it looked as if the strict demurrage regulations, the sharp watch for the return of cars from other roads, and the greatly increased capacity of modern freight cars, had enabled the roads to handle even greatly increased traffic with no special difficulty, but that delusion has been dispelled. Some Western railroad officials take a very depressed view of the situation, asserting that the freight blockade may be felt quite severely for a period of two months or more.

PERSONAL.

W. J. Taylor, of the Taylor Iron and Steel Company, arrived in this country on the Teutonic on the 9th inst., after an absence of over three months in England and on the Continent.

Henry Phipps and John Walker are now traveling on the Pacific Coast.

Thos. Clifton will on January 1 resume the superintendency of the old Riverside Rolling Mill, Cincinnati, which he operated for seven years under the proprietorship of E. L. Harper & Co. The mill will start up immediately after the holidays, as the Cincinnati Rolling Mill Company, on steel plate, fire bed and sheet.

Charles Atwater, who has just died at New Haven, Conn., was born 76 years ago at that place, where most of his long and active life was spent. In 1834 he graduated from Yale College and entered upon a theological course at Princeton. Later he went to Chicago, but returned to New Haven in 1845 and went into the hardware business, and for five years was a member of the firm of E. S. Wheeler & Co. He was president of the Mechanics' Bank; president of the Birmingham Iron and Steel Works; president of the New Haven Rolling Mill Company; president of the New Haven Wire Company, and president and manager of the City Bank, and first vice-president of the National Savings Bank.

The equity suit in the United States Circuit Court of the Delamater Iron Works against the defendants Robert Deely & Co. for an infringement of the patent to Capt. John Ericsson for the Ericsson hot-air pumping engine, and which has been for so many years before the courts, has been concluded against those defendants by their submission to a decree for perpetual injunction in the usual form. This suit was begun in 1888, before the death of Capt. John Ericsson or Cornelius H. Delamater. Between 3000 and 4000 pages of evidence were taken in the case, and among the 70 odd witnesses that were examined were some of the most eminent experts in the country upon the subject of steam and caloric engines.

CORRESPONDENCE.

The Development of Rod Rolling.

To the Editor: The paper read by R. W. Hunt on "The Evolution of American Rolling Mills" has, in one instance at least, as far as the Garrett Rod Mill is concerned, drawn out some criticism, and that by one who speaks in unmistaken tones, and one who has been connected with a firm—viz., the Cleveland Rolling Mill Company—who have played a very prominent part in the manufacture and improvement in the art of rod rolling. They were the first to embark in an entirely new method, so much so that by far the majority of rod-mill managers and engineers of that time predicted that the proposed way would be a failure, but the confidence of the Cleveland Rolling Mill Company was so great in the ability of the inventor carrying out to a successful issue what he had designed, that they spent over $130,000 before a rod was rolled. This was the first Garrett rod mill.

As the article on "The Thompson Repeater" makes an unduly free use of the Garrett rod mill and is very misleading, so much so that those not familiar with the art of rod rolling would be led to think that the Thompson repeater was the dog and the Garrett rod mill the tail to it, the inventor of the Garrett roll mill naturally objects. But the statement comes from a man of such a high standing as a successful manager and a scientific engineer that it must be weighed and answered carefully.

The first thing that surprises him is the description of the Garrett rod mill as described by R. W. Hunt. To the inventor this is not to be wondered at, for John Walker was one who stood in the front rank of the majority who claimed, while the first Garret rod mill was being built, that the mill would be a complete failure, and to think to-day that there are 11 Garrett rod mills in operation, capable of producing (if equipped with sufficient steam power and heating capacity) over 550,000 gross tons of rods annually, with or without the Thompson duplex repeater, no wonder he is surprised.

Next he says: "I heartily indorse the assertion that 'it was destined to play a conspicuous part in the American wire industry.'" This is decidedly a change of front and I am glad that John Walker has at last kindly condescended to notice the Garrett rod mill with a kind word. An indorsement from such an eminent source will carry great weight and the future success of the Garrett rod mill will be greater than ever.

In answer to the assertion that this rod mill hardly took its place as the leader in a large product till the adoption of the McCallip repeater, will say, to the best of my knowledge we did not run the mill over two weeks before we put in the McCallip repeater, so that we had not the opportunity to find out what could be done without a repeater, so far as quantity was concerned. The object in geting the repeater was to save labor and not to increase the output. I differ from him when he states that McCallip was the first to invent an automatic repeater, for I claim, and it can be proven, that John Bevis was the first, and while not perfectly automatic, still it gave the keynote to all repeaters that followed; this I state in justice to Mr. Bevis.

After at some length stating what the output of the Garrett rod mill was with one repeater and paying a passing tribute to all the inventors of reels, &c., he winds up with a sweeping challenge to all the rod-mill managers of the country to show any one thing that combined with the Garrett or any other open rod mill, has done more to increase the capacity than the duplex repeater invented by W. F. Thompson.

I accept the challenge, first, by making the sweeping assertion that a single duplex or any number of repeaters cut no figure whatever, so far as the output of a rod mill is concerned, but as a labor-saving device repeaters are a decided success. That the object of using a repeater is not to increase the output, but to decrease the cost of labor. My reasons are as follows:

In the rolling of rods, on one side of the rod train the pieces come out from the rolls in an oval shape. A man with a pair of tongs catches the first end of the rod at a desired distance from the end, then he turns around and enters the oval-shaped piece between close fitting guides into the next set of rolls, which make the oval section square. The same process is followed through the whole train on this side until the rod is finished as a round. On the other side of the rolls the pieces come out of the rolls in the shape of a square, which when entered (by a man with a pair of tongs or a repeater) into the next set, makes the square section oval. So far we have not been able to use repeaters on the oval side of the train—that is, where the pieces come out in an oval shape and it has to be entered between close fitting guides into the next set; but it is on the other side, or square side as it is generally called, where we can only use repeaters (I refer now in particular to the finishing rod trains), so that in practice, on one side of the rod train we use men (on the oval side), and on the other side we use repeaters (the square side), where they work very successfully. I may add, in connection with this, that while now we roll four and five rods at one time we still have only the same number of men on the rod train, on the oval side, as we had when we were only rolling one or two rods.

Now, in summing up, will say, if men can be used to operate in the rolling of rods on the oval side of the train, and roll four and five rods at once, why could not men be used instead of repeaters on the square side and get the same result as to output, seeing that it is much easier to double a square into an oval than it is to double an oval into a square?

This is my reason for saying that the repeater cuts no figure whatever, so far as the output of a rod mill is concerned; but when you consider a repeater in the light of a labor saving device, it stands well in the front, so far as rod rolling is concerned. I do not wish it understood that I desire to belittle repeaters, no matter of whose device, and while no doubt John Walker, in his desire to do justice to W. F. Thompson, allowed his zeal to get the better of his judgment, still great credit is due to John Walker, who, then in his capacity as superintendant of the Cleveland Rolling Mill Company, not only allowed, but as he states "I, myself, helped him to put the thing into practical operation," and, as a matter of fact, they were the first to use a double repeater.

Having endeavored to place the matter in its true light, I will conclude by saying that no great result was ever achieved by the single effort of any single individual, and that it is only combination of efforts and devices and keen competition that brings out best results, and I know of nothing that has been taken advantage of to such an extent as the wire rod business, seeing that it is a matter of fact that in 1882 only one Garrett rod mill was in existence. In 1891, 11 in successful operation, involving the expenditure of over $1,500,000 in construction, raising the average output of a rod mill in 1882 from 40 tons a day, double turn, to an average in 1891 of 230 tons a day, double turn. While many improvements have been made by way of repeaters, slope floor and automatic reels and improved guides, still, after all, the main stem is the rod mill above mentioned, and, poetically speaking, it stands to-day like the grand oak tree in its prime and full vigor, having stood the blasts of envy, malice and misrepresentation, covered with clinging vines, which add to its beauty (by the vines I mean the little side dishes, such as repeaters, reels, etc.), and while the vines tend to rob the oak of its nourishment (viz., glory), it is only near the surface, for the oak has taken such deep root that it can easily afford to spare it. Yours respectfully,

WM. GARRET.

JOLIET, ILL., December 7, 1891.

Virginia's Ore Supply.

To the Editor: E. C. Pechin, in his interesting article on "Virginia's Ore Supply," republished in *The Iron Age* of yesterday's date from the *Iron Belt*, has but lightly mentioned the valuable properties of the Virginia Mining and Investment Company, of which N. D. Moore is president and Nat. Hibbert general manager. It is not out of place, therefore, to give a little more extended notice of them. The three properties owned by the Virginia Mining and Investment Company, comprising over 2000 acres, are the copper mine, the coal mine and mine ore bank, near Vesuvius. To the coal mine near Stuart's draft a branch railroad has been constructed from the Norfolk and Western Railroad, and is now in use. For some months past the company have been shipping from 40 to 60 tons of ore a day, a high grade of limestone or Bessemer ore, from this mine to Buena Vista. The output would have been much larger but for inefficient machinery and the necessity for arching the openings. Within the last few weeks new and better machinery has replaced the old, and from this time forward the output will be more than doubled. At the mine bank near Vesuvius, the Virginia Company have graded a track or branch road from the Norfolk and Western Railroad to their washing machinery, a distance of 3 miles, and the Norfolk and Western Company have to-day a force employed in laying down the track, one-half of which was completed last week, and the remainder is expected to be ready for use on the 15th of this month.

The supply of ore at mine bank is practically inexhaustible, 2,800,000 tons being in sight—a brown hematite ore of excellent quality, cheaply and quickly mined. On this property there are also extensive developments by test pits, drills and shafts, showing vast deposits of manganiferous ore and of manganese, both of which will be shipped in due season. From mine bank in January, 1892, it is expected to ship from 200 to 300 tons of ore daily, and to steadily increase the output to 1000 tons a day, or more, as the demand arises. Experts describe this as the most valuable iron property in the South, and the company expect it to become the largest producing property in the State. There is a superabundant supply of water at all seasons, and a new and perfect equipment of machinery.

JOHN L. PEYTON.

STAUNTON, VA., December 11.

Drawing Sheet Metal.

To the Editor: I could scarcely avoid being rather amused at seeing the description you gave of an alleged new process of drawing sheet metal, on page 1027 of your December 10 issue—this method of drawing deep cups by repeatedly turning them upside down having been well known to me for several years. I do not claim to be the originator, as I knew of it having been done in Philadelphia long before I ever thought of it. Since then the Ferracute Machine Company, as well as other regular manufacturers of presses and dies, have freely made use of this process, as in

some cases it is better than the more usual method of keeping the cup the same side up. There is, however, no such great advantage as is claimed by this last inventor, as the principal strains upon the metal consist, in any case, of the crowding together, or upsetting circumferentially, and lengthening, or stretching out radially, these being incident to all cases where flat disks are drawn into cup-like forms. The mere bending of the metal over the corners of the dies is comparatively a minor matter, but there are cases where it is better to reverse it, as is done with the dies in question.

I am reminded by this case of another one that recently happened, where a customer wrote our company for advice as to whether he dare draw certain cups of sheet metal, and at the same time perforate them with a spur-shaped point, set in the female die, also stamping, lettering, &c., upon them from a design engraved in the "knock-out" ring working in said die. His doubts were caused by the existence of a certain recently issued patent, claiming all these points, which we assured our correspondent could be found in numerous dies made by us and shown upon our drawings during the last dozen or 15 years.

I have in mind other cases of the same kind, where simple and long-practiced operations have been more or less broadly claimed in the new patents. Such a process, for instance, is that of feeding sheet metals, so as to cut blanks at some distance apart and afterward to cut others from the spaces between the first with the same dies, arranged, of course, in proper groups. The object of this is obviously to get the female dies strong enough, by not crowding them too close together.

These instances only go to show the inefficiency of our patent examinations and the great desirability of having a larger and abler corps of examiners, the members of which should not only read all possibly obtained literature upon the subject of an industry with which they are dealing, but should be sent out by Government to visit the various manufacturers of standard goods, easily within their reach, that they might study the processes in ordinary use. If, for instance, the examiners in the department of sheet-metal tools could spend a few days in each year in going through our stamping factories, just as would the students of a technical school, they would become so familiar with old and well-tried methods as not to hamper the practicers of these industries with a lot of absurd patents, which, although worthless in a legal point of view, yet serve a valuable purpose to their owners in scaring off the smaller manufacturers, who would rather abandon some desirable processes than to have their customers threatened with lawsuits.

Is not some such system as is herein indicated one of the desirable Patent Office reforms which we may look for in the future? Should not the $3,000,000 or more surplus which the office has earned, and which lies in the Treasury to its credit, be made available by Congress, not only for giving the crowded together and overworked *personnel* more roomy and healthful quarters to work in, but to largely increase and improve the force itself? These remarks do not imply fault finding in regard to our Patent Office management, which is, on the whole, excellent, considering the picayune and niggardly facilities afforded it by Congress. When, however, the hoped-for reform comes the manufacturers and inventors of the country should do all in their power to have it thorough. We should aim not only to have force enough to do the work quickly, without the months upon months of tiresome delay now suffered by anxious patentees, but the examiners should be trained experts, having not only a theoretical but a practical knowledge of the great industries with which they deal. OBERLIN SMITH.

BRIDGETON, N. J., December 12, 1891.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., December 14, 1891.

The election of Mr. Crisp to the Speaker's chair of the House of Representatives of the Fifty-second Congress is presumed to point to a conservative course on tariff revision and possibly on free silver.

The arrangement of the *personnel* of the Committee on Ways and Means is a problem which is already perplexing the Speaker. The Democratic minority of the old committee was made up of Roger Q. Mills of Texas, Reuben McMillin of Tennessee, Roswell P. Flower of New York, Henry G. Turner of Georgia and Clinton R. Breckenridge of Arkansas Mr. Flower is the only one of the number who is not in the present House. According to the usual custom Mr. Mills would naturally be the chairman, or if declined by him, then Mr. McMillin.

These gentlemen, however, are not regarded as representing the tariff reform or revision idea of the conservative wing. In the late campaign Mr. Mills declared himself publicly as a straight out free trader. This was one of the elements of his weakness and ultimate defeat. The logic of the situation would have made Mills Speaker if pursued, but the opposition element were eminently practical in their view of results. Although Mr. Mills was the exponent of the advance doctrine of free trade as a national policy formulated by himself in a bill and by President Cleveland in a message, the speech of Governor-Senator Hill pronouncing tariff reform one of the issues and applied to the contest for the Speakership by such Senators as Gorman, Voorhees and Kenna changed the outcome to Crisp.

At the first flush of defeat Mr. Mills was deeply chagrined and declared to his friends that he would decline to serve on Ways and Means or any other committee.

Unfortunately for the new Speaker, the irascible Texan is not disposed to adhere to his heated determination after the last caucus count was announced. The appointment of Mr. Mills as chairman of Ways and Means is bitterly opposed by the chief supporters of Mr. Crisp in and out of Congress. He represents the extreme idea of reforming the tariff into a free trade institution. The other side represents a tariff policy not adjusted to the claptrap doctrine of a system arranged on the basis of the difference between wages of labor in Europe and the United States, but to the exigencies of the Presidential campaign of 1892. This potential and persuasive logic will prevail.

The appointment of Mr. McMillin would be regarded to a degree in the same light. The disposition of the Speaker is to appoint a new man like Springer, who was largely instrumental in his election through his friends. If Mr. Mills should be appointed it will be likely to create considerable friction on the one hand, and if he is not it will have the same effect on the other. The Speaker's course will therefore be watched with deep interest.

It is not expected that any other committees than the three announced will be ready until after the Christmas recess.

The American Railway Master Mechanics' Association have purchased four perpetual scholarships in Stevens Institute of Technology. These are open for competition by the sons of members of the association.

Pig Production Slightly Increased.

In spite of the discouraging markets during the whole month of November the pig-iron industry entered the current month with a slightly increased product. So far as accounts have been received from the different furnace plants dealing with the impending changes, they indicate that we shall enter the next year with an active productive capacity close upon the maximum yet attained. There is no evidence that the pressure which many manufacturers of pig iron must be enduring is forcing any considerable number to a suspension of operations. Nor is the outlook apparently discouraging those from blowing in who have or are about to complete repairs.

The weekly product of all the furnaces on December 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
December 1, 1891	298	188,135
November 1	304	187,685
October 1	306	181,615
September 1	299	170,846
August 1	296	169,576
July 1	293	171,115
June 1	258	146,782
May 1	227	115,590
April 1	228	113,483
March 1	257	134,536
February 1	294	146,050
January 1	302	167,509
December 1, 1890	340	183,846
November 1	342	177,958
October 1	336	179,263
September 1	323	171,776
August 1	324	164,798
July 1	336	175,227
June 1	345	180,791
May 1	344	180,099
April 1	344	178,474
March 1	343	180,991
February 1	334	173,651
January 1	333	174,038
December 1, 1889	328	169,151
November 1	323	165,225
October 1	311	151,067
September 1	294	134,068
August 1	286	145,899
July 1	285	141,419

The status of the anthracite furnaces was as follows:

Anthracite Furnaces, December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	19	8	3,326	11	4,228
New Jersey	12	2	862	10	3,243
Spiegel	3	3	255	0	0
Pennsylvania:					
Lehigh Valley	47	26	9,652	21	8,540
Spiegel	1	1	55	0	0
Schuylkill Valley	30	17	7,794	13	4,650
U. Susquehanna Valley	18	7	2,757	11	2,338
L. Susquehanna Valley	17	12	5,635	5	1,920
Lebanon Valley	16	9	4,569	7	2,235
Totals	163	85	34,905	78	27,154

For a number of months past our records show the following:

	Furnaces in blast.	Capacity per week.
December 1, 1891	85	34,905
November 1	87	33,802
October 1	85	32,459
September 1	82	31,214
August 1	88	32,860
July 1	92	37,892
June 1	91	36,561
May 1	90	35,331
April 1	91	36,508
March 1	93	38,543
February 1	95	40,212
January 1	101	43,166
December 1, 1890	105	43,474
November 1	104	42,141
October 1	100	38,627
September 1	104	39,115
August 1	106	41,013
July 1	112	42,543
June 1	117	45,142
May 1	123	46,912
April 1	119	46,110
March 1	115	45,790

In New York, Franklin Furnace resumed operations on the 7th inst. In the Lehigh Valley, the Bethlehem Iron Company have

started their seventh furnace, but the total active capacity of the valley has nevertheless been reduced by the stoppage of the Coplay, and one of the Lock Ridge furnaces of the Thomas Iron Company. The Lackawanna Company have blown out one of their five furnaces during November, while in the Lower Susquehanna Valley current capacity has been increased by the turning on Bessemer of No. 3 of the Pennsylvania Steel Company, which was producing spiegeleisen up to the 18th ult.

The following was the status of the coke furnaces on the 1st inst.:

Coke Furnaces, December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	6	3	3,492	3	2,065
Pennsylvania:					
Pittsburgh district	25	21	31,097	4	5,429
Spiegel	1	1	1,200	0	0
Shenango Valley	18	15	12,799	3	1,033
Juniata and Conemaugh Valley	20	9	5,563	11	3,630
Youghiogheny Val	5	1	887	4	1,880
Miscellaneous	4	2	1,630	2	1,140
Maryland	5	3	4,200	2	2,310
West Virginia	4	3	3,033	1	400
Ohio:					
Mahoning Valley	15	10	9,705	5	3,700
Central and Northern	16	12	10,758	4	2,975
Hocking Valley	14	3	1,053	11	2,835
Hanging Rock	15	8	2,097	7	1,330
Indiana	2	1	233	1	200
Illinois	18	13	18,539	5	5,660
Spiegel	1	1	1,200	0	0
Wisconsin	5	3	2,629	2	1,270
Minnesota	1	1	600	0	0
Missouri	6	1	758	5	2,760
Colorado	2	0	0	2	920
The South:					
Virginia	17	11	6,380	6	3,003
Kentucky	6	2	666	4	2,400
Alabama	37	25	17,502	12	6,480
Tennessee	12	10	5,531	2	850
Georgia	2	1	520	1	303
North Carolina	1	1	125	0	0
Totals	258	161	142,197	97	52,573

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
December 1, 1891	162	142,747
November 1	162	142,152
October 1	163	135,997
September 1	161	127,664
August 1	154	125,736
July 1	150	122,422
June 1	124	100,165
May 1	98	70,529
April 1	96	67,570
March 1	113	85,093
February 1,	125	94,473
January 1	143	112,153
December 1, 1890	168	127,634
November 1	168	122,556
October 1	170	127,247
September 1	156	119,757
August 1	150	113,040
July 1	163	120,673
June 1	167	123,340
May 1	169	122,489
April 1	173	121,560
March 1	169	122,595
February 1	169	118,568
January 1	169	119,396
December 1, 1889	162	116,319
November 1	160	112,269
October 1	154	102,454
September 1	141	96,744

There have been no notable changes in the producing districts of Western Pennsylvania. In Maryland, Deborah ran only 15 days in November and was then banked; it will, however, soon resume. In the Mahoning Valley, Mary has been doing the best work in its history. In November the furnace made 177½ tons in one day, and produced in one week 1187½ tons of the high silicon Ohio Scotch iron which is the specialty of the furnace. In Central and Northern Ohio, the River Furnace and Franklin have stopped, and the second Seneca has restarted. Glasgow, the largest producer in the Hocking Valley, is again at work, and Bessie followed on the 2d inst. The current make of the Hanging Rock region has been reduced by the blowing out of Huron. The Illinois Steel Company during November blew out one of the Joliet and one of the old South Chicago furnaces. Minnesota has entered the ranks with the new Duluth Furnace.

The South continues its heavy production. Roanoke has blown in after putting in a new hearth, bosh and inwall. Graham, a new furnace, is probably making iron at this writing, and at an early date Crozer No. 1, which was out for repairs, will be again ready to blow. Bristol has banked for six weeks on account of the breaking down of the blowing engine. Alabama is making iron at a heavy rate, producing 73,499 tons in November. The current capacity has been added to by the resumption of No. 2 Woodward on the 13th ult. There are no changes to note either in Tennessee or in Georgia.

The position of the charcoal plants was as follows:

Charcoal Furnaces, December 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England	14	5	420	9	610
New York	8	2	245	6	525
Pennsylvania	15	5	415	10	560
Maryland	6	1	132	5	475
Virginia	18	1	48	17	910
Ohio	10	5	401	5	345
Kentucky	3	1	96	2	800
Tennessee	8	4	1,038	4	410
Georgia	3	2	524	1	140
Alabama	13	8	1,783	5	650
Michigan	27	11	3,532	16	4,350
Missouri	2	1	338	1	293
Wisconsin	5	4	1,615	1	200
Texas	4	1	220	3	698
California	1	0	0	1	120
Washington	1	0	0	1	170
Oregon	1	1	226	0	0
Totals	139	52	11,033	87	11,256

As compared with previous months, the record stands as follows:

	Furnaces in blast.	Capacity per week.
December 1, 1891	52	11,033
November 1	55	11,731
October 1	58	13,159
September 1	56	11,908
August 1	54	10,980
July 1	50	10,801
June 1	44	10,056
May 1	50	9,730
April 1	41	9,295
March 1	51	10,890
February 1	56	11,365
January 1	59	12,280
December 1, 1890	67	12,738
November 1	70	13,262
October 1	66	13,389
September 1	68	12,904
August 1	59	10,745
July 1	61	12,511
June 1	61	12,312
May 1	52	10,698
April 1	52	10,804
March 1	59	12,606
February 1	58	11,378
January 1	59	11,485
December 1, 1889	66	12,779
November 1	67	12,293
October 1	63	12,047
September 1	60	11,327

There have been comparatively few changes with the charcoal furnaces. One of the new Grand Rivers furnaces in Kentucky is expected to start about Christmas, and the second is to follow early in February. Bloom, in the Hanging Rock region, has stopped until next March. In Michigan the Northern Furnace is idle. Ironton, in Alabama, has resumed. Tassie Belle, in Texas, was banked on the 19th, and Lone Star and Old Alcalde, in the same State, are repairing.

Decidedly misleading figures are published annually concerning the quantity of Lake Superior ore unsold at the close of navigation. The trade will clearly remember that last year the usual small quantity of ore was reported unsold, when, as a matter of fact, very large quantities of ore had been sent from the mines to lake ports without having found a buyer. We are informed upon good authority that at least 150,000 tons of ore of standard quality is now on the lake docks unsold, not counting the usual amounts of lean, off grade and unknown ores.

The Iron Bay Foundry.

The Iron Bay Foundry Company, at one time located at Marquette, Mich., now have a much larger plant in operation at West Duluth, Minn. They build engines, mining machinery and boilers, and now contemplate entering into the manufacture of saw-mill equipment. For some time past the mining business has been so dull that establishments of this kind have felt the effect to a considerable extent. Probably not more than one-fourth the usual force is at work at present in the shops of this company, but the prospects are a little brighter now, and it is expected that in the course of a short time the works will be running as usual. The buildings of this company are all of brick, and present a very handsome appearance. The boiler shop is a fine light building, 160 x 70 feet. The pattern shop near it is 70 x 40 feet. The machine shop is 200 x 75 feet, two stories high. The lower part of the machine shop only has been fitted up with machines for the present. The company intend eventually to place their small tools upstairs, leaving only the heavy machines on the ground floor. The second story of this building is supported mainly from the roof. The roof is built with very heavy trusses, and tie rods support the floor beams in the center, making the floor exceedingly rigid and solid, while avoiding the use of posts or columns in the large room below. The machine shop is furnished with a 12-ton traveling crane, of 52 feet 8 inches span, and it has a 75-foot run. This crane was built by the Walker Mfg. Company of Cleveland, and works very satisfactorily. A pattern storehouse, 100 x 60 feet, has been built, in which an immense stock of patterns of engines and mining machinery is carried. This stock is neatly arranged in racks and every piece is catalogued so that it can be instantly located. The foundry is 227 x 60 feet, and is furnished with three large swinging cranes. The blacksmith shop, 60 x 54 feet, is equipped with nine forges, a bolt furnace and a fagot furnace, the last named being operated in connection with a steam hammer capable of turning out quite heavy forgings. The drafting room of this company is a large, pleasant room in the second story of the office building. It contains numerous drawers in which the drawings are systematically arranged and are instantly accessible. Copies of all drawings are also kept in a large fire-proof vault on the same floor, so that in case of fire the company's business would not be very seriously interrupted.

Solidifying Steel Ingots With Slag.

James Munton, superintendent of the Chicago Tire and Spring Works, at Melrose, Ill., has been granted a patent, under date of December 1, for a process of solidifying steel ingots. The process consists in pouring molten steel slag on top of the molten steel immediately after the latter has been poured into the mold and before it has had time to set. Mr. Munton says that he has found the steel castings thus treated to be dense and homogeneous and free from pipes and blow holes. He ascribes the improvement in the quality of the casting partly to the weight of the slag upon the steel and partly to the fact that the molten slag serves to keep the surface of the steel longer in a molten or liquid condition and thus allows greater time and freedom for the escape of gases from the steel, and the passage upward of dross or impurities contained in the metal. He uses two ladles, one for the steel and the other for the slag, so that the latter can follow the former very quickly. The process is adapted to the pouring of all classes of steel ingots, but Mr. Munton has used it

mainly in the production of annular ingots for tire blooms to be rolled into tires by his patent process. A tire ingot 10 inches high, on which 2 inches of slag has been run, falls 2½ inches in the center, which shows how much the ingot condenses. It is noticed that the slag continues liquid after the steel has set. The slag is easily removed afterward, as it has no tendency to unite with the steel. Not more than one-half and often but one-third as much metal is required to be sheared off the top of ingots treated in this way, as compared with those poured without the slag covering.

The Hurd Refrigerator Works.

The Hurd Refrigerator Company of Duluth, Minn., have performed quite a creditable achievement during the current year in getting into position to transact business as actual manufacturers. Their factory is located at New Duluth, a manufacturing suburb of Duluth. Ground was broken for the factory last spring and the whole establishment has been erected and fully equipped during that time, starting into operation about the first of the present month. Very fine buildings have been erected ; all of them are very substantially constructed of brick. The factory is 385 feet long by 80 feet wide, divided into wood-working, machinery, zinc, finishing and packing rooms. These rooms are all separated from one another by heavy brick fire walls. The entire building is one story in hight, with a monitor roof running down the full length, giving a flood of light throughout the interior. The wood-working department is supplied with a complete equipment of machines for every purposes, some of which have been specially designed to meet the requirements of refrigerator work. All these machines have shaving and dust collectors attached to them, which are built on the Saginaw system, everything in the nature of sawdust, shavings or even small pieces of wood being drawn by a powerful fan to the boiler room, where it is automatically fed into the furnaces and used for raising steam. The zinc room is supplied with sheet metal machinery of the most approved type. The arrangements used here are also in the line of a special character and all the machines are extra heavy, so as to bear the strain of being pushed if necessary to their utmost capacity. Clark's kerosene soldering apparatus is used for soldering. Power is furnished wherever needed by a Reynolds-Corliss engine built by E. P. Allis & Co. of Milwaukee, two boilers supplying the steam. The entire works are heated on the Sturtevant blower system, for which the blower is located in the engine house, the size of this building being 65 x 45 feet. A one-story brick warehouse has been erected a short distance from the factory, the size of which is 350 x 80 feet. An independent incandescent electric-light plant has been installed, supplying the whole establishment with electric light.

The refrigerator made here is of an improved pattern invented and patented by Charles Hurd, and exclusively controlled by this company. It has a system of positive circulation, in which there cannot be any conflicting air currents. The flues are so arranged that warm air rises from the provision chamber at the bottom, passes up one side of the boxes all the way to the roof of the ice chamber, over which it passes to the other side, where it drops to the ice chamber, being slightly cooled in its passage up and across. The air passing over the ice is still further cooled, and is conducted under the ice rack down to the provision chamber, below which it enters on the opposite side from where the warm air rises. When the ice chamber has a lid on the top of it the flue passes over the lower part of the lid, which is made to come exactly in line with the upper part of the flue conducting the warm air upward. The drip pipe used in this refrigerator is made of seamed zinc, without any soldering whatever. The ice racks are made of corrugated zinc with tubular crosspieces and with broad slats, so as to hold vessels of any size. The hinges and locks are constructed after special designs. The latch works on a cam, by which it drops into place without the use of a spring, being held by the weight of the handle. The lock is particularly strong, holding the handle down so that it cannot be broken. The feet are solidly built, forming part of the frame work, and not consisting of blocks afterward nailed on. The lining of these refrigerators consists of mineral wool, which is one of the best non-conductors known. It is very tightly packed. All styles of refrigerators are made, from small boxes for family use up to high-class sideboards and large grocery refrigerators. The grocers' refrigerator has an automatic shelf in the provision chamber, by which an inside door is drawn down, closing the refrigerator when the shelf is pulled out, so that the cold air is not permitted to escape while the contents of the shelf are being handled. Only hard wood is used, such as birch, ash and oak. The birch takes a most beautiful polish, and permits of an exquisite finish in imitation of some of the rarest woods.

The company started out with most flattering prospects, having so many orders already booked that rapid work will be required the coming season to make the shipments as promply as desired. The factory is located along the tracks of the St. Paul and Duluth Railroad, in the heart of a magnificent hard wood lumber district, with saw mills in the immediate vicinity. Two side tracks have been built into the company's grounds, one of which brings lumber in and the other is intended to take refrigerators out. The main office of the company is located in Duluth. William J. Starr is president, Marcus W. Bates vice-president, Charles Hurd secretary and general manager and Orlando G. Brice treasurer.

Trade Publications.

THE BRIGHTMAN STOKER COMPANY of Cleveland, Ohio, have published an illustrated catalogue describing the Brightman mechanical stoker and smoke preventing furnace. It is claimed that this device, the construction and operation of which are fully described, will supply more steam, using bituminous slack, than the flat grate surfaces in common use. The actual labor required for boiler attendance with the Brightman stoker is less than one-half that required by a flat grate furnace of like capacity and burning similar fuel. The time consumed in "cleaning the fire" under a boiler provided with this machine is less than one-tenth that required for similar work with ordinary furnaces. As this stoker is operated mechanically, the feeding of the fuel is perfectly regular and uniform, and not dependent upon the whim or caprice of the fireman. The pressure is always under complete control, and by means of the regulating mechanism provided for such purpose, may be quickly increased or diminished, according to the varied demand. The uniform delivery of fuel to the grates, the constant high temperature of the combustion chamber, the absence of front doors, through which cold air enters ordinary furnaces, the gradual distillation of the coal as it enters the furnace from the feed hopper, and the movement of the grates by which the air spaces are kept open, all combine to insure the ignition of all combustible gases, and their complete utilization in heat making.

THE BRIDGEPORT CHAIN COMPANY of Bridgeport, Conn., have issued a catalogue describing the Triumph chains made by them. These chains are made of hard steel wire, and have great strength for weight of material used. They are much lighter in weight than flat sheet-metal chains, or the welded chains, in proportion to strength, do not kink, have no welds to give way, and have no sharp edges.

MANUFACTURING.

Iron and Steel.

The Arethusa Iron Works, manufacturers of plate and sheet iron, and operated by Geo. W. Johnson, at New Castle, Pa., are putting Hazeltine boilers over their puddling furnaces, and are using the waste heat to make steam.

The Indiana Iron Company and the Toledo Bolt and Nut Company, the two concerns being under the same management, are negotiating for the purchase of the rolling-mill plant of the Lancaster Iron Company, at Lancaster, Ohio. The concern propose to remove their present works, located at Toledo, Ohio, to Muncie, Ind., and will add a rolling mill to the same for the purpose of making iron to supply their bolt and nut department. The new concern will be known as the Indiana Iron Company.

At a meeting of the stockholders of the Oliver Iron and Steel Company of Pittsburgh, held in that city on Tuesday, the 8th inst., it was decided to increase their capital stock from $1,600,000 to $2,000,000. The increased capital stock will be used in enlarging and making some betterments at the various plants of this firm, which have been under contemplation for some time.

The Edgar Thomson Steel Works of Carnegie Brothers & Co., Limited, at Bessemer Pa., were closed down on Saturday, the 12th inst., for a period of two weeks for the purpose of making repairs. It is understood that considerable new and improved machinery will be introduced in the plant during the shut down, which it is expected will considerably increase the output. As the firm have a large number of orders on hand the suspension will be as brief as possible. It is understood that the new scale of wages, which goes into effect at this plant on January 1, 1892, has generally been signed by the men whose wages are affected by it. It is not anticipated that there will be any trouble whatever over the introduction of the new scale.

Greensburg, Pa., is to have a big rolling mill. An application has been made for a charter by the Greensburg Rolling Mill Company, composed of Gen. A. R. Coulter, George F. Huff, Judge James C. Clarke, Thomas Donahoe, F. J. Clopper and Henry Harris. The establishment of the Greensburg Steel Company, who went to the wall a year ago, has been purchased by the company, and the same will be reconstructed and a large rolling mill plant will be located. Three hundred men will be employed.

The Cambridge Iron and Steel Company, Cambridge, Ohio, manufacturers of sheet iron and sheet steel, have during the last two weeks put in cold rolls and added another annealing furnace. The firm are quite busy and are disposing of their product as fast as made.

The annual meeting of the stockholders of the Columbia Iron and Steel Company of Pittsburgh was held on Tuesday, December 8, at the office of the firm in Uniontown, Pa., where the works are located. R. Hogsett was elected president, to succeed C. Yeager, who declined to serve, and E. M. Butz was elected vice-president and general manager. J. H. Ewing, James A. Searight, H. C. Rush, C. Yeager and W. Eberhart were elected a board of directors. The general office of the company has been removed from Pittsburgh to Uniontown.

The new sheet mill now in course of erection by the Canonsburg Iron and Steel Company of Pittsburgh, Pa., whose plant is located at Canonsburg, Pa., will be completed some time in January. It will give employment to a large number of additional men.

The Joliet Steel and Iron Mill Company of Joliet, Ill., have completed their organization. They have a paid-up capital of $100,000. The officers elected are: President, L. F. Beach; vice-president, E. H. Stewart; treasurer, F. W. Werner; general manager, Sam Fewtrell; directors, L F. Beach, F. W. Werner, Sam Fewtrell, Fred. Sehring, M. Calmer, Dave Rosenheim and E. H. Stewart.

A company to manufacture metallic railroad ties were incorporated in Illinois last week. They are called the Railway Improvement Company, and their headquarters will be in Chicago. The capital is $10,000,000, and the names of the incorporators are: Arthur J. Hartford of New York, Homer N. Hibbard and Albert G. Wheeler of Chicago. As their name indicates, the object of the company is to improve the various articles used in the operation of steam railroads. The company, it is claimed, propose to put on the market for the first time in this country a new kind of railroad tie, made of metal, many times more durable though not much more expensive than the wooden ones now in use. It is proposed to manufacture 500,000 of these ties immediately in the rolling mills of various com-

panies in Chicago, to supply an order for that quantity that it is alleged has been received. As soon as they can find a suitable site the company will build their own rolling mills.

The contract for supplying the frame iron work for the Art and Manufactures Building at the Columbian Exposition at Chicago has been awarded to the Edge Moor Iron Company of Wilmington, Del. The building will be 1770 x 800 feet, and will call for about 12,000,000 pounds of iron.

The Girard Furnace of the Girard Iron Company, at Girard, Ohio, has collapsed. Although in the fifth year of its present blast, during which time no repairs of consequence were made, the furnace recently turned out 1324 gross tons of iron in one week. The stack as built in 1866 was 75 x 16 feet, but was remodeled in 1879 and the stack raised in 1884. A. M. Byers of Pittsburgh is the principal owner.

The defunct Cumberland Steel and Iron Works Company, at Cumberland, Md., will be reorganized and a new charter taken out. The capital will be $150,000, and the old works in South Cumberland will be improved and used for the operations of the company.

The stockholders of the Westerman Natural Gas Company of Marion, Ind., recently held their annual meeting, at which the following board of directors were elected: George Westerman, Sr., George Westerman, Jr., Fred P. Luce, Daniel E. Brong, Lewis C. Tower, Frederick E. Mason and Franklin C. Keyes. The board elected the following officers: George Westerman, Sr., president and general manager; Daniel E. Brong, vice-president; Lewis C. Tower, secretary and treasurer. The manufacture of merchant iron with natural gas has proved very satisfactory at this establishment, the results being superior to those obtained with coal.

It is announced that the Etna Furnace and furnace property at Ironton, Ohio, will be repaired and put in thorough order for operating at an early date.

At the plant of the Roane Iron Company at Rockdale, Tenn., an incline railway one mile in length has been completed from the new coal vein to the furnace.

One of the railroads has 565,000 tons of iron ore on its docks at Ashtabula, Ohio, which will be forwarded during the winter to furnaces at various iron-making centers. About 22 per cent. will go to the Shenango Valley, 10 per cent to Youngstown, Ohio, and the remainder to Pittsburgh.

Testimony has been recently heard in the case of Hussey, Brown & Co. of Pittsburgh against the Apollo Iron and Steel Company, involving a question of infringment of the patent of Dr. Wuth of Pittsburgh for making special low phosphorus muck bar by puddling. We understand that by tapping the cinder at one stage of puddling, what is practically Bessemer pig, the phosphorus in the muck bar is brought down to an extremely low figure.

Among the improvements which Jones & Laughlins are carrying out at their American Iron Works, South Side, Pittsburgh, is the conversion of an old nail plate train into a new mill for bars and finished iron and steel. At the converting works a new stock hoist for the cupola department is being put in, to be driven by a Crane engine. The Brown hoisting machine has not proved strong enough for the hard service assigned to it, and is now only doing auxiliary work in the stock yard. The cupola blowing capacity is being increased by the addition of a Sturtevant blower, and a new Harrisburg compound engine has been put in place to run the blower plant.

Machinery.

The Lake Erie Brass and Bronze Foundry of Cleveland, started last July by A. Wathey and T. McDonald has been extended twice since that time, and now further additions are contemplated, including machinery for finishing brass work.

A machine shop used by the Baltimore and Ohio Railroad at Fifty-ninth street and Woodland avenue, Philadelphia, has been burned at a loss of $10,009.

A certificate of incorporation of the American Fire Engine Company of Seneca Falls, N. Y., has been filed at Albany, N. Y. The objects of the company are the manufacture and sale of steam hand fire engines, hose carriages, pumps, steam heaters and fire apparatus. The capital is $600,000, divided into shares of $100 each. The directors are Horace C. Silsby, Horace Silsby, Charles T. Silsby, Seneca Falls; Chris. Ahrens, Hiram H. Nieman of Cincinnati, Ohio; Dubois Collier of Hudson; Geo. E. Holroyd, Waterford, N. Y. The shareholders are C. T. Silsby, H. S. Silsby, Horace Silsby, 70 shares each; Hiram H. Nieman, G. F. Hawkeotte, 65 shares each; C. Ahrens, 66 shares; Dubois Collier, 75 shares; Wm. Holroyd, 23 shares, and George E. Holroyd, 22 shares.

The Dois Mfg. Co., Canal Dover, Ohio, who have purchased the business of the Hawkins Nail Puller Company, formerly of Terre Haute, Ind., are at present meeting with considerable success in disposing of them, so much so as to warrant them in contracting for new machinery, consisting of punches, dies, drop hammers, &c., to enable them to turn out 1000 pullers daily. This they expect to accomplish by March 1, 1892.

The Dry Dock Engine Works, at Detroit Mich., have contracted for a new plant to cost about $100,000. The dimensions will be 201 x 66 feet, and the entire structure will be as nearly fire proof as possible.

Two additions, 100 x 30 and 100 x 40, respectively, will be built to the works of the Jenkins Machine Company, at Sheboygan, Wis.

A single rope, 4 miles long and weighing 20 tons, has been turned out at the ropery of Webster & Sons, Deptford, Sunderland. It is made of the best steel wire, and is intended for a colliery in the southwest of England, where it will be used for underground haulage.

Hardware.

The Anthony Wayne Mfg. Company, Fort Wayne, Ind., state that the demand for their Anthony Wayne and Western Star washers has been very satisfactory. Their factory is being run ten hours daily to meet the demand. They have completed a new building three stories high, 40 x 120 feet, to be used partly as a warehouse, painting and finishing shop. A new addition 45 x 80 feet and an annex 20 x 30 feet have also been completed, giving the company a total floor space of 21,200 square feet, in which $2500 worth of new and improved machinery has been placed. Their dry kiln capacity has also been increased from 14,000 to 26,000 feet, and electric illumination placed in every department.

The Kilmer Mfg. Company of Newburg, N. Y., who have a warehouse at 545 State street, Chicago, Ill., for supplying the Western trade with their bale ties, barb wire, &c., are now closing sale for said property at $50,000, which they purchased about five years ago for $23,000. They, however, have in view another location in Chicago where they can have a switch for deliveries from the different railroads direct to storehouse. The company advise us that they are increasing their capital stock $100,000, making $400,000 capital in all, and that they expect by February 1 of the coming year to have a capacity of about 100 tons finished wire per day.

E. E. Brown & Co. of Philadelphia, who make a specialty of sash weights, inform us that their output this year is already about one-third more than during 1890, with prospects of equally large increase during the coming year. This looks well for the building trade.

Miscellaneous.

Among recently licensed corporations in Illinois are the following: The Siphon-Ventilator Company, at Chicago; to manufacture ventilating, drying and smoke-consuming devices; capital stock, $150,000; incorporators, Henry N. Mann, Francis S. E. Gunnell and George M. Robinson. The F. L. Galigher Company, at Chicago; to manufacture ice and refrigerating machines; capital stock, $30,000; incorporators, Frank L. Galigher, John P. Hely and Silas Rhoades. Wilcox Water Heater Company, at Chicago; capital stock, $100,000; for the manufacture of heating and culinary apparatus; incorporators, Charles S. Wilcox, Margaret A. Wilcox, Charlotte C. Robertson, Ira E. Wilbur and W. R. Omohundro. The Chicago Vertical Safety Gate Company, at Chicago; capital stock, $500,000; for the manufacture of safety gates; incorporators, Ezra W. Jackson, Henry Jackson and E. J. Mills. The Landis Wrought Iron and Steel or Metal Curbing Company, at Chicago; capital stock, $500,000; for the manufacture of curbing; incorporators, Fred. L. Brooks, L. L. Smith and J. J. Rooney. The Simplex Thrasher Boiler and Engine Company, Chicago; capital stock, $1,000,000; incorporators, John J. McCorkell, F. P. Foster and W. W. Watson. The Knox & Stonier Architectural Sheet-Metal Ornament Company, Toulon; capital stock, $25,000; incorporators, Charles A. Knox, Harry P. Stonier and Harlon W. Pierce. The Western Tin Plate Company, Joliet; capital stock, $100,000; incorporators, James C. O'Connor, Thomas W. Creevy and Fred. Bennitt. Aurora Wire Goods and Mfg. Company, Aurora; capital stock, $25,000; incorporators, J. O. Curry, E. W. Hall, C. A. Van Velzer and D. A. Wedmore.

The American Zinc Lead Company of Boston and Canon City, Col., have purchased 537 feet fronting on the Chicago and Western Indiana Railroad, between Fifty-third and Fifty-fourth streets, Chicago, for $14,700. The company will at once erect a brick warehouse and refinery on the property.

The Bevington Art Metal Works, 11 to 23 South Jefferson street, Chicago, have been incorporated, with a capital stock of $200,000, to manufacture articles by the Bevington welding process.

The Milwaukee Car Wheel Works of Milwaukee, Wis., will be removed to St. Paul, Minn.

The Toledo Rolling Stock Company, capitalized at $1,000,000, have filed articles of incorporation at Toledo, Ohio. The object of the company is to lease, purchase, sell and deal in railroad cars of every description.

The Washburn & Moen Mfg. Company have their new wire mill in operation at Waukegan, Ill., but at present its entire product will be consumed in the barb wire factory of the I. L. Ellwood Company, at De Kalb, owned by the same persons. The Waukegan works have been built with remarkable rapidity, but would have been in operation at an even earlier date if the machinery contractors had been able to meet their engagements.

The Gloucester Pipe Works, at Gloucester, N. J., are to be enlarged.

The celebrated Plombogina graphite mine in Sonora, Mexico, will at last find its way into the markets east of the Rocky Mountains, a company having been formed under the style of the United States Graphite Company, with works at East Saginaw, Mich., who will take the output of the mine and manufacture a variety of graphite products. This mine has heretofore marketed its output exclusively on the Pacific Slope, having been owned by a San Francisco company. The graphite in its crude state is over 90 per cent. pure and can be worked up at a minimum expense.

Wm. T. Koken has sold his interest in the Scherpe & Koken Architectural Iron Company, St. Louis, to John F. Scherpe. The style of the firm remains the same as before the sale. This concern are well known throughout the country as manufacturers of heavy and ornamental wrought and cast iron work of all descriptions, and as such have built up a large trade. They have a commodious plant located on the Missouri Pacific Railroad and Choteau avenue, to which they have recently added many improvements. They are now placing in position two Heine safety boilers of 50 horse-power each, and are erecting a new office building 20 x 50 feet and two stories in hight. The upper floor will be utilized as a drafting room, while the lower floor will do service as an office proper. They have had a very successful year, and state the outlook is very encouraging.

The Atlas Iron and Brass Works.

The Atlas Iron and Brass Works of Duluth, Minn., are manufacturers of paper and pulp mill machinery, and have quite an extensive foundry and machine shop located at New Duluth. This establishment was formerly situated at Kaukauna, Wis., and was removed to New Duluth during the current year. The new works have been in operation some three months, and have turned out in that time important equipments for some large paper mills. They are now making two of the largest machines ever made in this country. The company have a well equipped foundry supplied with a 12,000 pound traveling crane, and have turned out castings weighing up to 3 and 4 tons each. The machine shop connected with these works is supplied with large tools capable of handling very large pieces. The buildings erected by this establishment are all of brick, and are located along the line of the St. Paul and Duluth railroad. G. Lind is the president, treasurer and manager of the company owning these works, whose corporate name is the Atlas Iron and Brass Works.

Judgments aggregating $827,706 were filed at Duluth, Minn., on Saturday of last week against the Iron and Land Company of Minnesota, Limited. It is understood that these judgments are filed for the purpose of attaching upon lands, bonds for the payment of which went on the market at the time of the Baring failure, which had an unfavorable influence, and the company did not sell bonds enough to warrant undertaking mining operations.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., December 15, 1891.

The past week has been one of more than ordinary interest in the Iron and Steel trade, but there is a good deal of conjecture in regard to what may be the outcome of the immediate future. It looks very much as though bottom figures were being gradually left behind in some grades of Pig Iron and also in Steel, but this is in a measure offset by extreme weakness in material in a more advanced state of manufacture. Plates and Angles are specially weak, owing to competition from Pittsburgh. Possibly competition is not the right word to use, because at the prices quoted competition is out of the question. When it comes to from one-tenth to one twentieth in price, there is something like competition, but when it is two or three tenths "at a lick" it is simply "a scoop," and Pittsburgh has done plenty of that lately. We simply state facts, Pittsburgh people as well as every other class of the community being entirely at liberty to conduct their own business in their own way. But no fair or full report of the market can be made without referring to matters of this kind. How soon things will find their level we do not undertake to say, but apart from these extraordinary cuts, business is looking very much better, although transactions of the kind mentioned naturally have a depressing influence. The holidays are so near at hand, however, that the trade are inclined to regard these matters as in some degree temporary and not likely to be repeated when business for the new year gets fairly under way.

Pig Iron.—There is no perceptible change in prices, although the market is a shade firmer in spots. The leading feature has been increased activity, but although large blocks have been taken without concession in prices, there is still plenty of Iron to be had at the old figures. There is much new Iron in the market, or to be more correct, there are so many new brands that it is hard to say where the price of one grade leaves off and where the other grade begins. It reminds us of the boy who bought from a street vender something he designated as hot mince pie, and who when he objected to it on account of its being cold and frozen was told, "Well, that's what we call hot mince pie, and it goes." It does not necessarily follow that sellers of Pig Iron are as independent as sellers of hot mince pie are supposed to be, but it does mean that it is not always safe to place entire confidence in the grading or in the naming of grades. Our Southern friends are adepts at this kind of business, and it is stated very positively that parties have been promised No. 1 grading at No. 2 prices, so that practically No. 1 Foundry has been sold at $16, delivered, the sellers taking credit all the while for sales of No. 2 at $16. Similar methods have also been applied to lower grades; this is certainly very demoralizing, and must eventually work serious mischief to the trade. No. 2 Foundry is said to have been sold as No. 2 plain at $15, and plain No. 2 at $14.25. These, of course, are exceptional cases, but they are matters of common repute, and in endeavoring to report the market fairly it is proper that they should be mentioned. This may be called making a sale with a string to it, and there has been a good deal of that kind of business lately. Bare mention of figures, therefore, does not by any means represent the market in these times; and as it is neither possible nor desirable to specify the details of individual transactions, those who use *The Iron Age* as an indication of prices should carefully read the context before they look for the figures. To summarize the position, then, we should say that sales have been larger than for a very long time past; prices are steadier, although there is plenty of cheap Iron to be picked up by a little looking round. But we again repeat the general tendency appears to be toward improvement. Sales at figures quoted herewith, prices being from 25¢ to 50¢ less for deliveries at points south and west of Philadelphia—such as Wilmington, Baltimore, York, Harrisburg, &c.:

Ohio Softeners, No. 1x	$18.00	@	$18.50
Ohio Softeners, No. 2x	17.00	@	17.50
Standard Penna, No. 1x	17.50	@	18.00
Standard Penna, No. 2x	16 00	@	16.50
Medium Penna, No. 1x	17.00	@	17.25
Medium Penna, No. 2x	15.75	@	16.00
Plain No. 2 Southern	14.50	@	15.00
Virginia, No. 1x	16.50	@	17.25
Virginia, No. 2x	15.50	@	16.00
Standard Neutral All-Ore Forge	14.25	@	15.00
Ordinary Forge Cinder mixed	13.50	@	14.00
Hot-Blast Charcoal	20.00	@	22.00
Cold-Blast Charcoal	24.00	@	27.00

Muck Bars.—Sales are extremely light consumers having no disposition to increase their engagements until after the holidays. A few small lots for immediate delivery have been offered at $25.50 @ $25.75, f.o.b. cars at seller's mill, but for January deliveries and later $26 @ $26.25 would be inside figures.

Steel Billets.—An unusually large business has been done in this line during the past week, and as the later sales were at higher prices, it is supposed that the upward turn has set in. At all events makers claim that they have not been getting a new dollar for an old one in recent transactions, and they think it is about time to call a halt. Asking prices to-day are about $26.50 for Slabs and Billets, for deliveries to near-by mills, but at Harrisburg and Susquehanna points sales have been made at figures very much lower than anything higherto named in print. But the market, as we have already said, is very much steadier, and in the present state of feeling it is not likely that $26.25 @ $26.50 would be shaded for Schuylkill Valley points, or $25.50 @ $26, Susquehanna. At the same time it must be conceded that the capacity for production is vastly in excess of consumption, and until some of the mills get busy on Rails it will be difficult to advance prices in miscellaneous Steel.

Steel Rails.—There are no new features of special importance. The amount of business secured for 1892 is considerably in excess of that of a year ago, and as there is a continuous demand for small and medium sized lots, mills are in comparatively good condition. Prospects are certainly very favorable in this department, and full employment is confidently expected during spring and the later months.

Bar Iron.—Market very quiet. Some business has been done for car material, besides which there is a very fair general demand. But prices are not strong, and under special efforts to secure business it is almost impossible to maintain even the rates recently ruling. This condition of affairs is considered as partly due to the season of the year, but the generally unsettled feeling in prices is somewhat inimical to new business. When buyers find that sellers are unusually anxious to enter orders, they at once conclude that prices may possibly be lower, and the result is either a postponement of business or a cutting in two of the order. Nobody wants to buy much of anything this side of January, and for the present bids for such deliveries are not quite up to the figures paid in recent transactions—say, 1.70¢ @ 1.75¢ for city deliveries, or 1.60¢ @ 1.65¢ at most of the interior mills.

Plates.—A very considerable amount of business has been dangling around; some of it has been caught on to, some has gone West, and a good deal is yet unplaced, and probably will remain in that condition until after the turn of the year. The unsettled condition of prices is not favorable to the immediate placing of orders, unless deep cuts are made, and as every mill in the country seems to be determined to get business at some price, it is no wonder that buyers show indecision, unless for material that is required at once. The following quotations therefore represent what are supposed to be ruling prices, but on desirable specifications half a tenth to one-tenth less is not likely to be refused, if offered by good parties.

	Iron.	Steel.
Tank Plates	1.90 @ 2.00¢	2.00 @ 2.10¢
Refined	2.20 @ 2.30¢	2.10 @ 2.20¢
Shell	2.30 @ 2.40¢	2.25 @ 2.35¢
Flange	3.20 @ 3.30¢	2.50 @ 2.75¢
Fire-Box	4.00 @ 4.25¢	3.00 @ 3.50¢

Structural Material.—There is not very much new business coming in at present, and some of the mills are beginning to run quite close to the end of their order books. The material for the Chicago contract taken by the Edge Moor Iron Company will be furnished by Pittsburgh mills, so that locally manufacturers are not gaining very much, even on important transactions. Better things are hoped for in the near future, however, although in the meantime the feeling is not very buoyant. Prices nominally about as follows, but there is more or less weakness and irregularity: Angles, 1.95¢ @ 2.05¢; Sheared Plates, 1.90¢ @ 2¢, and in some cases lower prices, to about $\frac{1}{10}$¢ more, for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Sheets.—Demand, as usual at this season, is very light, but in preparation of the holiday suspension of work mills are running pretty full on stock. Prices steady and for best makes about as follows:

Best Refined, Nos. 14 to 20	3.00¢ @ 3.10¢
Best Refined, Nos. 21 to 24	3.10¢ @ 3.15¢
Best Refined, Nos. 25 to 26	3.20¢ @ 3.30¢
Best Refined, No. 27	3.40¢ @ .....
Best Refined, No. 28	3.50¢ @ .....

Common, ¼¢ less than the above.

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about ¼¢ lower than are here named:

Best Soft Steel, Nos. 14 to 20	3¢ @ 3¼¢
Best Soft Steel, Nos. 21 to 24	3¼¢ @ ....
Best Soft Steel, Nos. 25 to 26	3¾¢ @ ....
Best Soft Steel, Nos. 27 to 28	4¢ @ ....

Best Bloom Sheets, ¼¢ extra over the above prices.

Best Bloom, Galvanized, discount	@ 67½ %
Common, discount	@ 70 %

Old Material.—Very little doing at present. Prices are fairly steady for anything that consumers happen to want, but sales cannot be forced without breaking prices, which are about as follows: Iron Rails, $21.50 to $22 asked; Steel Rails, $16 @ $17, delivered; No. 1 Railroad Scrap, $20.50 @ $21, Philadelphia, or for deliveries at mills in the interior $20.50 @ $21.50, according to distance and quality; $14.50 @ $15.50 for No. 2 Light; $14 @ $14.50 for best Machinery Scrap; $13.50 @ $14 for ordinary; $14.50 @ $15.50 for Wrought Turnings; $10 @ $10.50 for Cast Borings, and nominally $23 @ $25 for Old Fish Plates, and $16 @ $16.50, delivered, for Old Car Wheels.

Wrought-Iron Pipe.—A meeting of the manufacturers was held last week, with the usual formality of re-affirming prices. In the open market things are very much demoralized, demand being slow and discounts anywhere from 5 % to 10 % greater than those nominally quoted, viz:

Butt-Welded Black	57½ %
Butt-Welded Galvanized	47½ %
Lap-Welded Black	67½ %
Lap-Welded Galvanized	55 %
Boiler Tubes, 2½ inch and under	52½ %
Boiler Tubes, 3 to 6 inch	60 %
Boiler Tubes, 7 inch and larger	55 %

Chicago.

(*By Telegraph.*)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, December 16, 1891.

It can at least be said of the local market that circumstances are developing which are expected to lead to an early improvement in the demand for Iron and Steel. The heavy orders for Steel Rails and cars are having their effect on quite a number of buyers in other lines, who think that low prices must soon give way to a better state of things, and that now is a good time to stock up. They are the advance guard of buyers, who are expected to appear in force before long. One of the local railroads placed orders for 4200 cars last week and from 8000 to 10,000 more are reported to be in sight in this immediate district. The roads having their own car shops are also buying large quantities of material and will run the works to their full capacity for months to come. Manufacturers of specialties in the line of railroad supplies have suddenly jumped from quietness to the most pronounced activity. Several such concerns are known to be full of work until late in the spring. As usual under such circumstances, a great deal of business is being done quietly for special reasons, buyers and sellers being alike disposed to guard their movements.

Pig Iron.—Some sellers of Coke Iron have been able to book considerable business in the past week, mostly in the way of renewing contracts now about expiring. Consumers evidently felt indisposed to take the chances of higher prices later, while the makers were evidently willing to renew at close to the rates made before. Some Southern Coke was sold at concessions in order to move accumulated stock, but at the moment the pressure in this direction seems to have been removed. Lake Superior Charcoal has been in some demand; transactions running up to 1000 tons are reported. The activity in car work causes a fresh demand from makers of malleable castings, as well as inquiry from car wheel manufacturers, and orders for Charcoal Iron are likely to be increased soon from this cause. While all prices are still very low, there is a more cheerful feeling and sellers are quite confident of an early improvement. Quotations are as follows, f.o.b. Chicago:

Lake Superior Charcoal	$16.75 @ $17.25
Local Coke Foundry, No. 1	15.50 @ 16.00
Local Coke Foundry, No. 2	14.75 @ 15.00
Local Coke Foundry, No. 3	14.25 @ 14.75
Local Scotch	16.00 @ 16.50
Ohio Strong Softeners	17.75 @ 18.25
Southern Coke, No. 1	15.50 @ 16.00
Southern Coke, No. 2	14.75 @ 15.00
Southern Coke, No. 3	14.00 @ 14.25
Southern, No. 1, Soft	15.00 @ 15.50
Southern, No. 2, Soft	14.25 @ 14.50
Southern Gray Forge	13.75 @ 14.00
Southern Mottled	13.25 @ 13.50
Tennessee Charcoal, No 1	17.50 @ 18.00
Alabama Car Wheel	19.50 @ 20.50
Coke Bessemer	16.50 @ 17.00
Hocking Valley, No. 1	17.00 @ 18.50
Jackson County Silvery	17.50 @ 18.00

Spiegeleisen—Is moderately active, but in carload lots only.

Bar Iron.—The mills reaching this market are now very well supplied with work and it would take but a slight increase in the volume of business to make them very independent. In fact, jobbers say that they are even now unable to buy of the larger mills making full assortments within $1 ℔ ton of the price quoted to them but two weeks since. Manufacturing consumers are inquiring for large lots of Iron to be used outside of the car or the agricultural implement trade. If the close of the year were not so near at hand, when inventories are taken, the movement to lay in stock would be quite general. There are a few mills still selling at 1.65¢, half extras, Chicago, but they are not nearly so numerous as those asking 1.70¢. Store price is still 1.85¢.

Structural Iron.—The local demand for building shapes is now down to its usual winter level, but all indications point to a heavier trade than ever next year. The Pemier Steel Company of Indianapolis are now in the market with Beams up to 12 inch, but, though not in the combination, maintain the schedule price. Car-Truck Channels are reported to have been sold to some party as low as 2.10¢, Chicago. Angles are quoted at 2.05¢ @ 2.15¢, and Universal Plates 2.15¢.

Plates.—Mill agents are in receipt of better inquiries, but the volume of business is still light. Heavy buyers are taking in stock when they can get it at what they consider bottom figures. One sale of 1000 tons Tank Steel is reported to have been made in this way at very close to 2¢, Chicago. Carload lots of Shell Steel from mill are quoted at 2.20¢ @ 2.40¢, Chicago; Flange, 2.45¢ @ 2.65¢. Dealers report Tire trade still very light.

Sheets.—Stocks of Light Sheets are pretty well cleaned up here, except Common Stove-Pipe Iron, which has been somewhat neglected, the preference of consumers evidently running to smooth or planished. Common Black is quoted by mill agents at 2.90¢ @ 2.95¢, Chicago, for No. 27, while it is sold from stock at 3.10¢ @ 3.20¢. Stocks of Galvanized Iron are short everywhere, but prices only a trifle stronger.

Merchant Steel.—Mild Bar Steel is quoted at 1.80¢ @ 1.90¢ in carload lots, Chicago, from mill. Machinery Steel ranges from 2¢ to 2.25¢, according to the standing of the maker. Open, Hearth Spring and Tire Steel of standard makes sell at 2¼¢. The volume of business has been a little better of late, and prospects are rather brighter. Tool Steel is unchanged at 6¼¢ upward, according to quality.

Track Supplies.—The Steel Rail trade of the past week has been rather light, so far as the actual entering of orders, but the inquiry continues active and the prospects are excellent for a great deal more work. Quotations are unchanged at $31 upward, according to specifications. Splice Bar orders are fairly numerous, with Iron or Steel quoted at 1.80¢ @ 1.85¢. Track Bolts are unchanged at 2.70¢ @ 2.75¢ for Hexagon Nut, and Spikes are firm at 2.20¢ @ 2.25¢.

Old Rails and Wheels.—A sale of 1500 tons Old Iron Rails is reported at $22, but this is hardly regarded as a fair criterion of the market. A lot of several hundred tons brought out $21 at an interior point, and the valley mills are offering only $20.75 here. At the same time Old Rails are unquestionably cheap at present prices, and with the improving outlook for Finished Iron. The visible supply, however, is quite large, and this has its influence on both consumers and dealers. Old Steel Rails are being picked up by dealers at $14 @ $14.50, as they run; consumers are not inquiring for them at present. Old Car Wheels are quiet. They could be sold very freely at $15.25 @ $15.50, but holders generally want considerably more.

Scrap.—As a result of inquiries from consumers the dealers are now firmer in their views, and although actual sales have not been made to any notable extent it is altogether likely that our quotations are now a trifle under the market. Selling prices are as follows, per net ton: No. 1 Railroad, $18; No. 1 Forge, $17.50; Horse Shoes, $18; Car Axles, $22; Fish Plates, $20; No. 1 Mill, $12; Pipes, $11.50; Sheet Iron, $8; Cast Borings, $7; Wrought Turnings, $10; Axle Turnings, $12; Machinery Cast, $11.50 @ $12; Malleable Cast, $9; Stove Plate, $9; Mixed Steel, per gross ton, $11.75; Coil Steel, $15.50; Leaf Steel, $17.75.

Metals.—Copper is again weaker. Carload lots of Lake can be had at 10¼¢, and casting brands 10¼¢ @ 10½¢. A sale of several carloads of Spelter was made at 4.50¢. Most consumers of Spelter are hanging off to see what the metal market develops. In Pig Lead the dullness continues. Dealers report that 250 tons will cover the sales for the week here at 4.05¢, with little or no inquiry except for January Lead, which at the moment is not available.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date December 14, 1891, say: Notwithstanding the buying of all classes of material by the car makers to cover large contracts for cars recently taken, the market remains in about the same condition as for some time past. There has been considerable activity in Lake Superior Charcoal and also low grades Southern Coke Irons, but only a moderate demand for Ohio Irons of good quality. The meeting which is to be held here during the present week by those interested in a deep-water channel on the lakes and rivers promises to be one of no ordinary interest to those interested in shipping on the lakes. Should the meeting be able to devise means of securing the desired legislation by Congress and thereby reduce the cost of carrying Ore to the lower lake ports, the Northern Coke furnaces would be placed in a better position to hold their own against the competition of Southern Irons. With active but rather weak market we quote as follows:

Lake Superior Charcoal, all numbers	$17.50 @ $18.00
Lake Superior Coke, Bessemer	16.50 @ 17.00
Lake Superior Coke Foundry, all ore	17.50 @ 18.00
Ohio Blackband (40 per cent.)	18.00 @ 18.50
Southern No. 1	16.25 @ 16.50
Southern Gray Forge	14.00 @ 14.50
Jackson County (Ohio) Silvery	18.25 @ 18.75

Cleveland.

CLEVELAND, December 14, 1891.

Business seems to be affected by the approach of the holiday season. Seasonable goods in the hardware line are not moving at all satisfactorily, on account of the weather, which persists in resembling July more than December. The Iron Ore men are at sea regarding next season and Pig Iron dealers are a bit weary waiting for the better condition of things that have promised right along for the past three months. Little change for the better is hoped for before the middle of January.

Iron Ore.—The final cargoes of Lake Superior Ore are now being unloaded at Lake Erie ports. Dealers vary widely in their estimation of the season's receipts, but 5,250,000 tons is perhaps an average estimate. The amount of unsold Ore on the docks is insignificant, while one year ago it formed a very large per cent. of the year's output. The railroads are rushing the Ore to the furnaces as fast as possible, and when navigation begins in 1892 the docks at Cleveland, Lorain, Fairport, Ashtabula, Erie and Buffalo will be well cleared up. A canvass of the Ore offices to-day resulted in obtaining little information beyond a unanimity of sentiment in favor of deferring any attempts at opening the market until well into the new year. That prices will rule slightly higher than at the beginning of business last year seems probable, but is entirely contingent upon the condition of the Pig-Iron market. Prices are unchanged. Eastern furnacemen—two of them, at least—have asked for next year's prices, but have not been able to get much information.

Pig Iron.—The market continues in an unsettled condition. Prices have not changed in any way. The demand reported last week for Forge Irons continues,

but is not very pronounced. Bessemers are weak. Furnacemen are preparing for their annual inventories, generally taken at the beginning of every new year. Many of the furnaces will be closed down at that time. No sales of importance are reported for the week just closed. Strictly local quotations are as follows:

Nos. 1 to 6 Lake Superior Charcoal	$18.50 @ $19.00
Nos. 1, 2 and 3 Bessemer, per ton.	16.00 @ 16.25
No. 1 Strong Foundry, per ton..	16.20 @ 16.70
No. 2 Strong Foundry, per ton..	15.20 @ 15.70
No. 1 American Scotch, per ton.	16.20 @ 16.70
No. 2 American Scotch, per ton.	15.20 @ 15.70
No. 1 Soft Silvery, per ton.....	16.50 @ 17.50
Mahoning and Shenango Valley Neutral Mill Irons, per ton....	14.00 @ 14.50
Mahoning and Shenango Valley Red Short Mills, per ton.....	14.50 @ 15.00

Old Rails.—The market continues weak, and prices are not very firm even at $22.25 @ $22.50 for Old Americans.

Nails.—The market for Wire Nails is weaker, $1.80 @ $1.90 ℔ keg, in stock, being to-day's quotations. Cut Nails are unchanged.

Manufactured Iron.—There is a fair demand. The mills are as busy as ever, and seem likely to continue so until well into next year.

Scrap.—Market dull, and prices are very firm on the basis of $19.50 for No. 1 Railroad Wrought.

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., ST. LOUIS, December 14, 1891.

Pig Iron.—A review of the market for the past week fails to show any change whatever. Agents report a scarcity of inquiries and there is little or no business being transacted at the moment. The accumulation of Pig Iron in the South is a question which is beginning to attract the attention of furnacemen, and unless some improvement in the demand is shortly experienced the future will prove very uncertain. To enable them to get rid of some of this surplus stock, furnacemen are quoting some low prices. Under the circumstances higher prices seem out of the question, as the market is practically in the hands of buyers. There is some inquiry for delivery extending over the first six months of next year, but prices named by furnacemen were too high to meet the views of consumers, and as the result comparatively few orders have been entered for future delivery, and furnacemen will enter the new year with but few orders on their books. Transactions during the past week have been of a light character and it is an exceptional case where a sale of over 100 tons is reported. We quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	$15.25 @ $15.50
Southern Coke, No. 2 Foundry,	14.25 @ 14.50
Southern Coke, No. 3 Foundry,	13.50 @ 13.75
Gray Forge.....	13.00 @ 13.25
Southern Charcoal, No. 1 Foundry.....	17.00 @ 17.50
Southern Charcoal, No. 2 Foundry.....	16.50 @ 16.75
Missouri Charcoal, No. 1 Foundry.....	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry.....	15.00 @ 15.50
Ohio Softeners.....	17.75 @ 18.75

Bar Iron.—Mills are not overcrowded with work. A moderate business is transacted at prices quoted below. Railroads are sending in inquiries, and the general outlook is improving. We quote as follows: Carload lots at East St. Louis, 1.70¢ @ 1.75¢; small lots from store, 1.85¢ @ 1.90¢, according to quantity.

Barb Wire.—Business in this department is light. Jobbers are buying only as their requirements demand, notwithstanding the talk of higher prices after January 1. We quote as follows: Painted, 2.70¢; Galvanized, 3.20¢; terms 60 days, or 3 % discount for cash in ten days.

Wire Nails.—No improvement to note in this department. Demand continues to fall off, and prices are shaded to secure desirable orders. Lots from mill command $1.95; from store, $2.10 @ $2.15 is quoted.

(By Telegraph.)

Metals.—No change to note in Pig Lead. Transactions in this metal have been limited to car lots, and price is nominal at 3.90¢ @ 4¢. Trading is quiet, and consumers are not in the market at present prices. The same remarks apply to Spelter. The market is lifeless, and while an occasional carload is disposed of, there is nothing in the way of large orders. Offerings are made at from 4.45¢ to 4.50¢, at which prices consumers do not appear interested.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, December 16, 1891.

Pig Iron.—The accumulation of stocks has led to more urgency to sell Pig Iron, and as buyers could only be induced to purchase by making concessions, this has been done, so that prices are now back to about the lowest point of last summer. This remark applies to about all grades of Southern Iron. Gray Forge can now be bought at $9.50, Mottled coke $9, and No. 3 Foundry $10 at the furnace, spot cash and prompt shipment. Some 3000 tons were sold during the past week at these prices. These grades are offered for deliveries running up to next June, at 25¢ ℔ ton advance on these prices, and there appears to be more disposition to sell on the part of those who have most strenuously been contending for higher rates. How far the recent embarrassments of furnaces in Pittsburgh and elsewhere have been influential in developing a desire to sell is problematical, but every straw has some weight, and there are no indications that the production of Southern furnaces will be seriously curtailed. The preliminary report of stocks indicates that there has been less accumulation during the month of November than had been generally expected, but it is well known that December is a month when large consumers reduce their consumption of Pig Iron, and that the supply in any event will be excessive at the close of the year. On certain lines of railroad there is still some difficulty in obtaining cars to make prompt deliveries of Iron, but in general transportation facilities are abundant On the other hand, there are urgent applications on the part of large consumers to have deliveries postponed until the early months of the coming year. That the bountiful crops will give new life to general business is certain, but it will be some time before the turns can be made which will bring the reviving current through all its veins, and hope deferred maketh the heart sick. This is the condition of the Iron trade. Most grades of Southern Iron are lower. We revise quotations as follows:

Foundry.

Southern Coke, No. 1....	$14.75 @ $15.00
Southern Coke, No. 2.....	13.75 @ 14 00
Southern Coke, No. 3.....	12.75 @ 13 00
Ohio Soft Stone Coal, No. 1.....	16.25 @ 16 50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley...	17.00 @ 17.50
Hanging Rock Charcoal, No. 1....	20.00 @ 21.00
Hanging Rock Charcoal, No. 2....	19.00 @ 20.00
Tennessee and Alabama Charcoal, No. 1...	16.50 @ 17.00
Tennessee and Alabama Charcoal, No. 2.....	15.50 @ 16.00

Forge.

Gray Forge	12.25 @ 13.50
Mottled Neutral Coke.....	11.75 @ 12.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	19.25 @ 19.50
Lake Superior Car Wheel and Malleable.....	18.25 @ 18.50

Louisville.

LOUISVILLE, KY., December 14, 1891.

Pig Iron.—The market continues in about the same quiet condition. While there is little inquiry from consumers, as usually at this season they prefer to not make contracts until after closing up the year's business and take stock, particularly when no special inducements in the way of prices can be offered them. There is also no disposition on the part of holders to force sales, and though furnaces as a rule are willing to accept orders running through the next six months on a basis of $11 for No. 2 Foundry at furnace, others are met with whose product is so well sold for this period that they are practically out of the market. While the contracts for Steel Rails placed during the last 60 days show very well, aggregating in the neighborhood of 250,000 tons, there has not been the buying on the part of car companies and railroads which it was felt the tremendous demands for rolling stock would necessitate ere this, and the business of some other lines of manufacture is somewhat checked, owing to the lessened demand for their product during the winter months, and as it is felt that it is only a question of a short time when these factors come into the market, it would seem that those who count on a good time coming shortly have some reason for their position, though there are others who as firmly believe that there can be no improvement in prices until a goodly percentage of furnaces blow out and the output is cut down considerably. The simple fact, however, that the country can take the present enormous production without the market showing absolute weakness indicates a healthy condition of affairs, and, though prices are low, there is a decided firmness on the part of the majority of producers not to sell unless they can get in the neighborhood of the present prices, and it is pretty generally conceded that prices will not probably go much, if any, lower. While there is still some very cheap Southern Car-Wheel Iron to be had for prompt delivery, the general situation is favorable. The requirements for the large number of cars recently contracted for will take considerable Iron. Some of the furnaces are already sold up for the next six months, while others are out of blast for repairs. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry...	$14.50 @ $15.00
Southern Coke, No. 2 Foundry...	13.50 @ 14.00
Southern Coke, No. 3 Foundry...	13.00 @ 13.50
Southern Coke, Gray Forge.....	12.50 @ 12.75
Southern Charcoal, No. 1 Foundry.	16.00 @ 17.00
Southern Car Wheel, stand. br'nds	18.00 @ 20.00

Geo. H. Hull & Co. have removed their Louisville office to Rooms 80 and 81, Louisville Trust Company Building.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, December 15, 1891.

Pig Iron.—While business continues rather light, there is a firmer feeling being developed, particularly as regards Bessemer, and the opinion generally obtains that under the advent of the new year there will be a materially increased demand, which, it is hoped and expected by producers, will soon be followed by better prices. Bessemer Iron has advanced 25¢ per ton within the past two weeks and sellers just about as scarce now as they were at $15 then. So with Forge Iron, it is claimed that there were some few sales made as low as $13 25, cash, but no good brands can be obtained under $13.50, and some furnacemen are indifferent about making additional contracts at the price last quoted. Furnacemen say that with the cost of production cut down to the lowest possible limit current rates afford little

or no margin for profit, and, with an improved demand, they are confident of being able to get better prices, and if they do not, it is pretty evident that some of them will blow out, as they are not all in condition to sell their product at cost or a loss. It is very evident then that the present low prices were abused, mainly by furnacemen being pressed for money, and the only way to realize the same was to sell their product at the best price they could obtain. This is the situation at the present time and, there is every indication that the expectations of furnacemen of a better market early in the new year will be realized. We quote prices as follows:

Neutral Gray Forge	$13.50 @	$13.60,	cash
White and Mottled	12.50 @	13.00,	"
All-Ore Mill	14.00 @	14.50,	"
No. 1 Foundry	15.50 @	16.00,	"
No. 2 Foundry	14.75 @	15.00,	"
No. 3 Foundry	14.25 @	14.50,	"
No. 1 Charcoal Foundry	22.00 @	22.50,	"
No. 2 Charcoal Foundry	20.50 @	21.00,	"
Cold-Blast Charcoal	25.00 @	27.00,	"
Bessemer Iron	15.20 @	15 25.	"

There have been several lines, both of Mill and Bessemer, sold for delivery during the first quarter of 1892 at prices quoted, and it is doubtful whether they could now be duplicated.

Muck Bar.—There is no improvement; market very dull; is being offered freely for delivery at most any time between January and April at $26, cash, and it is said that a sale has been made as low as $25.75. The stock piled up is much larger than it was a year ago, and the outlook for those mills making Muck Bar to sell is not very encouraging.

Manufactured Iron.—There are but few orders coming forward at present, nor is it expected at this season of the year, but there is every indication that business will improve next month. The contracts recently closed for so many railway cars and locomotives are sure to create an active demand for all kinds of Finished Iron and Steel as well, and then it is expected that there will be other large buyers on the market early in the new year. The chief complaint made by manufacturers is in regard to prices, which, it is claimed, afford little or no margin for profit, and with an improved demand it is expected that improved prices will follow. City-made Iron is quoted at 1.67½¢ @ 1.70¢ for Bars; Plate and Tank, 1.90¢ @ 2¢; No. 24 Sheet, 2.60¢, all 60 days, 2 % off for cash. Skelp Iron is dull and lower. Grooved is now quotable at 1.60¢ @ 1.65¢, and Sheared at 1.85¢ @ 1.90¢, four months, 2 % off for cash.

Nails.—There is no improvement in the demand, and prices continue very unsatisfactory to manufacturers; however, business is nearly always dull this month, but there is a possibility of an increased demand in January, as some of the large jobbers may want to contract, particularly as prices are very low and cannot possibly go lower, as current rates do not afford a new dollar for an old one. We continue to quote Steel Cut Nails, 30 @ 35 average, at $1.55 @ $1.60, f.o.b. at factory in the Wheeling district, 60 days, 2 % off for cash. Wire Nails have been sold as low as $1.70, but some manufacturers are refusing to sell below $1.75, 60 days, 2 % off for cash. The Wire Nail trade, so far as relates to the makers, is just as bad as the Cut Nail trade, and it is not strange that negotiations are pending with a view to form a syndicate by the former. It may be a source of satisfaction to the Cut Nail men to find their competitors like themselves not doing any good, but it will not help them financially.

Wrought-Iron Pipe.—The report got out by some way or other that the Manufacturers' Association at their meeting in New York last Wednesday had dissolved, but there was no truth in the report. The New York meeting reaffimed former prices and adjourned over to meet in Pittsburgh next, which would not have been done had the association been dissolved as reported. However, while former prices were reaffirmed, the market is really an open one, and each manufacturer is free to make his own prices, hence it is useless to quote the syndicate rates.

Old Rails.—There has been very little business in Old Iron Rails of late, and prices are weak; may be freely quoted at $23 @ $23.25. The inquiry for the past year has come chiefly from the Mahoning and Shenango Valley districts; very few consumers here in Pittsburgh. Old Steel Rails are being bought for remelting at $17 @ $18 for short and long pieces.

Wire Rods.—The dullness which has characterized this interest for some time past continues, and in the absence of any recent sales it is difficult to give reliable quotations. This may be attributed in part to the depressed condition of the Wire Nail trade. May be quoted nominally at $33.50 @ $34, f.o.b. at makers' mill.

Ferromanganese—Domestic 80 % may be quoted at $62.50 @ $63, cash. Thus far there have been no sales reported under $63, but it is intimated that for a desirable order the price quoted would be shaded.

Structural Material.—There is not much new business, but mills are still pretty well employed working up old contracts, and the outlook for the new year is very encouraging. There was no truth in the rumor which was current that the Beam and Channel syndicate had collapsed. We speak knowingly regarding the matter. No change in prices. Channels and Beams, 3.10¢; Tees, 2.50¢ @ 2.60¢; Angles, 2¢; Universal Mill Plates, Iron, 2¢ @ 2.05¢; Refined Bars, 1.80¢ @ 1.85¢.

Steel Plates.—No change in prices. A continued poor business reported, with outlook for the new year regarded as encouraging. Fire Box, 3.75¢ @ 4.25¢; Tank, 1.95¢ @ 2.10¢; Shell, 2.15¢ @ 2.20¢; Flange, 2.35¢ @ 2.40¢.

Merchant Steel.—There has been no recent change in prices. Crucible Tool Steel, 6½¢ @ 7¢; do. Spring, 4¢; do. Machinery, 4½¢ @ 5¢; Bessemer Machinery, 2.10¢ @ 2.20¢; do. Toe Calk, 2.10 @ 2.20¢; Tire Steel, 2.10¢ @ 2.20¢; Steel Bars, 1.80¢ @ 1.85¢.

Barb Wire.—Business is still reported light, as it usually is just at the close of the year, while prices remain unchanged. Painted, $2.45, and Galvanized, $2.95, f.o.b. at factory in the Pittsburgh and Cleveland districts. The syndicate is still holding together, and predictions of some of the knowing ones that it would go to pieces have not yet been realized.

Billets and Slabs.—There is more inquiry and a firmer feeling is being developed. Billets may be quoted $24.50, f.o.b. at makers' mill, cash. A manufacturer reports a sale of 2000 tons at $24.50, while a week before $24 was the best bid he could obtain; and some sales were made a couple of weeks ago as low as $23.75.

Railway Track Supplies.—There is no abatement in the demand for Track Supplies and prices are firm as quoted: Spikes, 2.15¢, 30 days, f.o.b. at makers' works; Splice Bars, 1.70¢ @ 1.80¢; Track Bolts, 2.65¢ with Square and 2.75¢ with Hexagon Nuts.

Steel Rails.—There is continued inquiry and the syndicate price, $30, cash, f.o.b. mill, is well maintained. All the mills in the country are filling up with orders and the outlook for the next year is very promising.

Old Material.—The demand continues light, while prices remain unchanged. No. 1 Railroad Wrought Scrap, $18.50 @ $19, net ton; Cast Scrap, $13, gross; Steel Rail and Bloom Ends, $18 @ $18.50.

Connellsville Coke.—There is a fair business at unchanged prices, as follows: Furnace Coke, $1.90; Foundry do., $2.30; Crushed do., $2.65, all per net ton, f.o.b cars at ovens.

New York.

Office of *The Iron Age*, 96-102 Reade street, NEW YORK, December 16, 1891.

American Pig.—As far as reported, the orders placed with local sales agents during the past week have been unimportant and Eastern consumers appear inclined to proceed cautiously now that provision for their probable requirements during the first two or three months of the new year has been made. There is no evidence of any pressure of well-known brands of Foundry for sale and for these the market remains steady. In the instance of inferior Foundry Iron and Mill grades there is yet irregularity, however, with orders solicited at previous lowest prices. We quote Northern brands, $16.75 @ $18 for No. 1; $16 @ $16.50 for No. 2, and $14 @ $14.50 for Gray Forge. Southern Iron sells at $16.25 @ $17 for No. 1; $15.50 @ $16 for No. 2; $14.50 @ $14.75 for No. 3 Foundry, and $14.25 @ $14.50 for Gray Forge. Charcoal Iron holds its own, current business being chiefly at prices on the basis of $18.25 @ $18.50 at tidewater for Southern brands and $17 at Buffalo for Lake Superior.

Steel Rails.—No important orders have been placed with Eastern manufacturers during the week under review and conditions that have heretofore stood in the way of consummation of business under treaty still exist. It is considered only a question of time, however, when many of these orders will have to be placed and prices are, therefore, firmly held at $30, f.o.b. Eastern mill, for heavy sections. The last report of the Board of Control shows shipments up to the 1st inst. of 1,008,000 gross tons, standard sections, and orders booked up to the same date for 1891 delivery amounting to 1,119,000 tons. The deliveries during November were, therefore, 108,000 tons, while the sales footed up to 57,000 gross tons.

Manufactured Iron and Steel.—New orders have been few in number and of unimportant character. Business that comes up is sharply competed for, but not in a manner that disturbs values greatly. We continue to quote: Angles, 1.90¢ @ 2.10¢; Sheared Plates, 1.85¢ @ 2.25¢; Tees, 2.40¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 1.9¢ @ 2.1¢ for Tank; 2.15¢ @ 2.30¢ for Shell; 2.40¢ @ 2.65¢ for Flange; 2.60¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Bars are 1.7¢ @ 1.9¢, on dock. Scrap Axles are quotable at 2.15¢ @ 2.20¢, delivered. Steel Axles, 2.15¢ @ 2.25¢, and Links and Pins, 2.15¢ @ 2.20¢; Steel Hoops, 2¢ @ 2.5¢, delivered.

Steel Billets.—Eastern Billets have been selling to a fair extent at about $25, at mill, and $26 @ 26.50, delivered, for ordinary sorts, and $28, delivered, for high carbon. Demand lacks spirit, however, and the market is yet in rather uncertain form. Western Billets are offered at prices on a parity with those current for Eastern product.

Spiegeleisen and Ferromanganese.—German 20 % Spiegel has been offered at $26.75, landed here, without leading to business, and for English, $27.50 @ $28 is quoted. Foreign Ferro has very limited outlet and would bring little, if anything, over $62.50 for 80 %.

Merchant Steel.—We quote Hot-Rolled Shafting 2¢ @ 2.10¢; Machinery, 2.10¢ @

2.25¢; Tire, 2.15¢ @ 2.25¢, and Toe Calk, 2.20¢ @ 2.30¢, delivered.

Old Material.—Dealings are still few in number and confined almost wholly to small unimportant parcels. Tee Rails may be quoted at $21 @ $21.50 f.o.b. Jersey City, and No. 1 Wrought Scrap $19 @ $19.50 at same point.

The New York office of the Cleveland City Forge and Iron Company has removed from 44 Dey street to the Electrical Exchange Building, 136 Liberty street.

Metal Market.

Copper.—The event of the week has been the sale of 2,000,000 or 3,000,000 pounds of Lake Superior Ingot by the Calumet and Hecla Company, for January and February delivery, at 10½¢. This transaction, it is understood, involves stock held in store here by the company, and none to be shipped from the works. The spot holdings are estimated at 10,000 tons. Whether the price named has a rider in the shape of a "guarantee" of protection to the buyers in the event of prices ruling lower during the two months is uncertain, but generally suspected to be the case. That other producers have been unable to sell, except in a very limited way, at the same price, is an undisputed fact, which of itself is significant in this connection; and stronger circumstantial evidence is presented in offerings at 10⅝¢ and even at as low as 10½¢, that failed to arouse a great deal of interest. For the present consumers are not bidding above 10¢ for supplies for delivery any considerable time ahead, but at that price, there is reason to believe, a large business could be done. Casting brands have been sold in a small way at 10¢ for prompt delivery, but there are no buyers of futures except at a round fraction under that price.

Pig Tin.—Except that prices have averaged a fraction higher in response to an upward turn in values in London, the market is without change. Local speculation, such as it is, seems to be confined within the ranks of a few operators who have the field all to themselves, and the trade demand drags wearily, as usual at this season of the year. Single ton lots have been sold to the out of town trade at lower prices than the holders would name to local traders who have "puts" outstanding, and also at practically the same figures recorded on local transactions made on net cash terms. In short, the competition for out of town business is keener than ever before and suggestive of an effort on the part of a few firms to monopolize the entire business. At this writing 19.90¢ @ 19.95¢ seems to be market value for 10-ton lots, and 20¢ @ 20.10¢ the range on ordinary jobbing parcels. Straits shipments during the first half of December were 1100 tons to Great Britain and America, and 50 tons to Continent.

Pig Lead.—The market has been almost at a standstill throughout the week. Orders for larger quantities than single carloads figured as the exception and even of those small parcels the sales were by no means numerous. Sellers have manifested a degree of indifference quite as prominent as that displayed by buyers, and seem to derive more or less comfort from the fact that supplies in the East are much smaller at present than they have been for some time. The selling prices are 4.30¢ @ 4.35¢, as to delivery and size of lot; 4.25¢ is the general bid price.

Spelter.—There is no evidence of any increase in the demand at this point from any class of consumers, and the orders that have been placed lately in the West do not appear to have sufficient force to affect values. Carload lots of Western are still offered at 4⅛¢ for immediate and near future delivery.

Antimony.—Demand has beens low, and buyers have secured ordinary parcels on 30 days' terms at prices slightly under those that have been asked of late. Hallett's is quoted at 12½¢ @ 12⅝¢, LX at 14¼¢ @ 14½¢ and Cookson's at 15¢@ 15½¢, in wholesale quantities.

Tin Plate.—Fair purchases of light weight (100 lb and under) Coke Finish Plates for delivery during the first quarter of 1892 have been made at $5.25, also 14 x 20 full weights at $5.50 and 14 x 19¼ at the same price. Ternes have also met with fair sale, being cheaper for future arrival than on the spot. Out of store business has been chiefly of routine character and at former prices. We quote: Coke Tins—Penlan grade, IC, 14 x 20, $5.25; J. B. grade, do., $5.35; Bessemer do., $5.30; Siemens Steel, $5.45. Stamping Plates—Bessemer Steel, Coke finish, IC basis, $5.70 @ $5.75; Siemens Steel, IC basis, $5.80 @ $5.85; IX basis, $6.85 @ $7. IC Charcoals—Melyn grade, $6.50; for each additional X add $1.50; Allaway grade, $5.80; Grange grade, $5.90 @ $5.95; for each additional X add $1.10. Charcoal Ternes—Worcester, 14 x 20, $5.75; do., 20 x 28, $11.50; M. F., 14 x 20, $7.45; do., 20 x 28, $15; Dean, 14 x 20, scarce; do., 20 x 28, $10.60; D. R. D. grade, 14 x 20, $5.25; do., 20 x 28, $10.10; Mansel, 14 x 20, $5.50; do., 20 x 28, $10.30; Alyn, 14 x 20, $5.50; do., 20 x 28, $10.50; Dyffryn, 14 x 20, scarce; do., 20 x 28, $11.10. Wasters—S. T. P. grade, 14 x 20, $5; do., 20 x 28, $10; Abercarne grade, 14 x 20, $4.90; do., 20 x 28. $9.75.

New York Metal Exchange.

Two sales are reported, as follows:

TUESDAY, December 15.

10 tons Tin, January..... 19.95¢
25 tons Tin, December..... 19.95¢

Coal Market.

The Anthracite trade is dull and sloppy. As one of the big operators remarks: "There are no prices," but the alleged offenders who recognize no law or obligation are individuals, those who are a law unto themselves. No company would admit underselling, but it is more than suspected that few would lose an opportunity to reduce their pile, even if necessary to resort to some sort of evasion. Individual Stove Coal has sold as low as $3.80 alongside. Prices for this size of $3.90 @ $4 are common, whereas the latest circular is $4.40, which has never been realized. Steam Coal is dull; Pea, $2 @ $2.50, f.o.b.; Buckwheat, $1.50 @ $1.75, there being little uniformity. Prices in the general market have weakened materially since the middle of November, due to enormous production, as Coal is going into consumption on a large scale, but not in proportion to the quantity mined. At a meeting of the trade on Monday nothing was done.

The production for the week was 879,788 tons; for the year, 37,509,559; increase over last year, 4,039,593. Pennsylvania Railroad Coal tonnage, 298,815 tons, and Coke tonnage, 118,936; Clearfield output for the week, 72,354; Cumberland, 76,800; Beech Creek, 55,525; Broadtop, 43,651; Norfolk and Western, 46,989, and Chesapeake and Ohio, 74,234; Reading tonnage, 250,000, of which 25,000 was sent to New York. The steamship trade in Soft Coal is steadily increasing. The association controlling the Soft Coal trade will continue present arrangements for another year. Delay in making deliveries is attributed to lack of cars, caused by the pressure for grain transportation. The Philadelphia *Ledger* says: "All the shippers of first-class Coal are reported to have their hands full in supplying their contracts already booked, and most of them are not accepting any new orders for shipment this season. There are no spot cargoes of Soft Coal seeking buyers, and even the inferior grades of Coal are not in excessive supply." The situation in the Bituminous Coal regions of Indiana, in which some 20,000 miners are on strike, is a gloomy one for the strikers.

The Philadelphia *Record* says: "A comparison of the figures for the three mining regions shows that the Wyoming, a large part of whose Coal goes to New York, produces over 52 %, the Lehigh 15 to 16 % and the Schuylkill region over 31 %. While the Schuylkill and the Wyoming regions are steadily increasing their production, that of the Lehigh region remains about stationary, This failure to keep up with the increase of the other regions makes it appear that the Lehigh is constantly losing, but this is in percentage rather than in actual tonnage. Still, up to the end of October the Lehigh shipments were actually 70,363 tons less than during the corresponding period in 1890, while those from the Wyoming and Schuylkill regions showed a gain of over 3,500,000 tons. It is from these great fields, where tens of thousands of acres of Coal land still lie undeveloped, that the Anthracite supply of the future will come."

Sixteen years ago the production was but 16,182,000 tons and in 1880 it was but 23,437,000.

The Newport, Va., *Commercial* of December 5 says: "Ninety-three foreign steamships have taken bunker Coal from Lambert's Point, Norfolk, Va., in November, the quantity averaging 25,000 tons. This is the largest quantity of Pocahontas Coal ever taken in a single month by foreign steamers from that port."

Vessel freight from New York harbor to Boston, 65¢ @ 80¢ and discharge.

Financial.

The approach of the holidays begins to be felt in the gradual slackening of the volume of business in some departments. Accounts are being adjusted, and some hesitation is natural while any doubt remains with respect to the action of Congress on important measures. Although three coinage bills have been introduced, including that of Senator Stewart of Nevada, prominent bankers express no apprehension of any movement affecting the metallic basis of currency during the coming year. The improved monetary condition in Europe, succeeding the recent tension in financial circles, is followed by a reduction of the Bank of England rate of discount to 3½ per cent. and gold is again coming this way more freely, but it is intimated that sometimes a calm precedes a storm—the fundamental causes of disturbance on the Continent are in no degree abated. As indicating the drift of events, it is noted that Chancellor Caprivi of Germany has concluded commercial treaties with some half dozen neighboring powers, ostensibly in the interest of general trade, but with the suspected design of isolating France by cutting off, so far as possible, the springs of her prosperity and paralyzing any attempt on her part to uphold Russia in any future emergency. The grain markets are dull, with lower foreign cables and liberal shipments from India. A London cable reports Russian crops as 176,000,000 bushels, against 223,000,000 last year, including Poland. A Northwest telegram reports stocks there 10,165,000 bushels, against 8,272,000 last year. Exports promise to continue on a liberal scale. Provisions were fairly active, with a few disgusted holders selling to prevent further loss.

The grain blockade in the West is partly relieved. Western roads are making every effort to increase their rolling stock. Still, grain movements are much retarded. About 20 per cent. of the corn crop is yet ungathered, and the forward movement this winter will depend much on the prices offered. Cotton continues on the downward turn, with stocks still accumulating.

The total imports at this port for the month of November have been in excess of the common estimates. The imports of merchandise fall $2,269,848 below the corresponding total of last year, but with an increased flow of specie the total, including the precious metals, is nearly $3,000,000 above the aggregate for November of last year. The exports exclusive of specie have been very large, especially during the last two months. The total for 11 months, since January 1, is $30,000,000 increase compared with the same time last year. Exports for the week, $9,284,000 ; imports, $7,989,000.

The stock market was irregular and generally strong. The trunk line and granger stocks were influenced by the heavy grain traffic and several of the specialties touched higher figures than before for a long time. The reduction of the Bank of England rate to 3½ per cent. seemed to have a favorable influence upon the London markets, which was reflected here. On Saturday there was a weaker tone, due to reports of a heavy defalcation, afterward shown to have been of speculative origin. On Monday the market was tame. The advance of sterling exchange despite the large exports of grain and produce was construed as evidence that large amounts of American stocks were being sold on European account. The opinion was advanced in intelligent quarters that the stocks held abroad are far in excess of common estimates. Although gold imports are temporarily checked, for reasons given, confidence is felt that the return flow will soon resume full proportions. The low value of cotton also has an influence. Total amount of gold received since September 12, $27,516,398. Government bonds are easier, while railway bonds are strong.

Quotations are as follows:

U. S. 4½s, 1891, extended	100
U. S. 4s, 1907, registered	116½
U. S. 4s, 1907, coupon	117½
U. S. currency 6s	108½

Bar silver closed in London at 43⅜d. ℔ ounce. The commercial price of bar silver in New York was 95¼¢ ℔ ounce.

The posted rates for bankers' sterling are $4.84 @ $4.86. The market is firm, with slight offerings of commercial bills and a good demand for settlements in connection with the closing of the year.

Money is easy, as shown by the improving bond market, A single house is said to have sold $20,000,000 worth within a short time. Time loans on first-class stock collateral were freely offered at low rates. Commercial paper was in little better supply, and the demand was good. Rates were 4½ to 5 per cent. for 60 to 90 day indorsed bills receivable and 5 to 5½ for four months' acceptances. The bank statement showed a gain of $2,150,500 in cash and of $1,475,875 in surplus reserve, which now stands at $15,000,000.

The *Financial Chronicle's* November report of railroad earnings reflects a continuance of larger totals. In amount of increase the October statement was the best of any monthly return for about two years, the gain being over $4,500,000, or 8.54 per cent. The November statement shows a gain of nearly the same dimensions—namely, $4,261,416, and the ratio of improvement is 9.42 per cent.

The Department of Agriculture reports the average price of wheat on the farm as 85.3¢ ℔ bushel, and says that this is 2½¢ ℔ bushel higher than the average of the ten years from 1880, and has been exceeded only once since 1883—namely in 1888. The average for corn is figured at 42.2¢, and it is stated that since 1883 the value has been higher only in 1887 and in 1890, in both of which years the crop was very small. It is also stated that wheat enters the winter under much less favorable circumstances than was the case a year ago. The Michigan State crop report puts the condition of wheat for December at 93, against 102 one year ago. The Ohio State crop report for December makes the condition of wheat 75, against 76 in November and against 101 in December last year.

A meeting of representatives of New York merchants was held on Monday, favoring a bill to the New York Legislature providing for an appropriation of $500,000 in aid of the Columbian Exposion, at Chicago, and inviting the cooperation of all commercial bodies throughout the State.

The mercantile failures continue to increase from week to week. The total number from January 1 to date is 11,620, as compared with 9842 in a like portion of 1890.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, December 16, 1891.

Scotch warrants have been advanced to 47/6, but there has been very little trading, as the peculiar attitude of the largest holders prejudices outside interests, while the shrinkage in consumptive demand is also a drawback. Cleveland has receded to 37/9 and Hematite to 47/5½, with fair business at the decline. Stocks in warrant stores have increased of late and now include 501,000 tons Scotch and 153,000 tons Cleveland.

Pig Tin declined early in the week to £90. 5/ under pressure of realizations, but has since improved to the extent of 15/, without, however, any activity. The general situation here is much the same as it was last week.

Copper prices have ruled lower under the influence of free offerings from America, restricted demand from home consumers and unfavorable reports as to the condition of the American market. The downward movement of prices was, however, arrested by revival of speculative purchases to a fair amount, and better inquiry from India.

There has again been a very fair business in Tin Plate, including good lines of oil canners' sizes, but at prices that leave the sellers little or no profit. Several parcels of 14 x 20 Bessemer Cokes were offered at 12/ in Wales without finding buyers. Ternes are quieter, makers having advanced prices of doubles 6d. There is quite a large inquiry for Black Plates. Stocks at British shipping ports are about 226,000 boxes, against 333,000 tons held a year ago.

Steel Ship Plates are in brisker demand, and the market is firmer, with makers quoting £6. 5/ at Barrow. Latest sales of warrants were at 47/3 for Scotch, 37/7½ for Cleveland and 47/6 for Hematite.

Bessemer Pig.—There is only a fair inquiry, but prices are steady at 49/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Scotch Pig Iron.—Very little change in character of the demand and prices still rather week.

No. 1 Coltness,	f.o.b.	Glasgow	56/6
No. 1 Summerlee,	"	"	54/6
No. 1 Gartsherrie,	"	"	54/6
No. 1 Langloan,	"	"	55/6
No. 1 Carnbroe,	"	"	48/6
No. 1 Shotts	"	at Leith	57/
No. 1 Glengarnock,	"	Ardrossan	55/6
No. 1 Dalmellington,	"	"	49/6
No. 1 Eglinton,	"	"	49/6

Steamer freights, Glasgow to New York, 1/: Liverpool to New York, 10/.

Cleveland Pig.—Business is slow and the market rather weak at 37/9 for No. 3 Middlesborough, f.o.b.

Splegeleisen.—Demand has fallen off but sellers hold firmly. English 20 % quoted at 84/ @ 85/, f.o.b. shipping port.

Steel Rails.—The demand has not improved and old prices are asked. Heavy sections quoted £4. 2/6 and light sections £5 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—A very quiet market, and makers still quote £4 for 7 x 7, f.o.b, at N. W. England shipping point.

Steel Billets.—There is only a moderate business and prices are unchanged. Bessemer, 2½ x 2½ inches, quoted at £4. 5/, f.o.b. at N. W. England shipping point.

Steel Slabs.—The market remains very quiet. Bessemer quoted at £4. 5/, f.o.b. at N. W. England shipping point.

Old Iron Rails.—Business moderate at former prices. Tees quoted at £3 @ £3. 2/6 and Double Heads £3. 2/6 @ £3. 5/, f.o.b.

Scrap Iron.—Prices steady but business moderate. Heavy Wrought Iron quoted at £2. 10/ @ £2. 12/6, f.o.b.

Crop Ends.— Very little doing in this line. Bessemer quoted at £2.12/6 @ £2. 15/, f.o.b.

Tin Plate.—Prices are very irregular. usiness only fair. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	15/ @ 15/6
IC Bessemer Steel, Coke finish	12/6 @ 13/
IC Siemens " " "	13/ @ 13/3
IC Coke, B. V. grade	12/3 @ 12/6
Charcoal Terne, Dean grade	12/3 @ 12/6

Manufactured Iron.—There is only a moderate business passing. Prices a shade lower on Common Bars, but otherwise unchanged. We quote, f.o.b. Liverpool:

	£	s.	d.		£	s.	d.
Staff. Ordinary Marked Bars	8	10	0	@	.....		
" Common "	6	12	6	@	6	15	0
Staff. Bl'k Sheet, singles	7	17	6	@	.....		
Welsh Bars (f.o.b. Wales)	5	10	0	@	5	12	6

Pig Tin.—The market closes firm, but quiet. Straits quoted at £90. 17/6, spot, and £91. 7/6 for three months' futures.

Copper.—Market barely steady at the close and quiet. Merchant Bars quoted at £44. 12/6, prompt, £45. 5/ three months' futures. Best selected £49.

Lead.—Soft Spanish has weakened to £11. 5/, and the market is slow at the decline.

Spelter.—The market steady at £22. 10/ for ordinary Silesian, but quiet.

Col. T. Nemegyri, proprietor of the Irondale Furnace, at Independence, W. Va., denies the published statements that he has sold his furnace to New York parties for $50,000. He says the report is entirely without foundation.

HARDWARE.

Condition of Trade.

AS USUAL, with the approach of the holiday season and the close of the year there is a falling off in the volume of business. Travelers are being withdrawn from the road and retailers and wholesale houses are beginning their preparations for the annual inventory. With this in view they are placing orders with reserve, purchasing such goods as are called for by the immediate requirements of their trade; or in a few lines, which from the special condition of the market they consider an entirely safe investment, placing orders for next season. As a consequence of this condition of things trade is quiet, except in holiday lines, in which manufacturers report an excellent business, some of them having difficulty in furnishing goods as promptly as they desire. In the matter of prices the market remains in the same general condition as for the past few months, with continued weakness in a number of staple lines, which has resulted in constantly declining prices. As a result of this state of things ruling quotations on many staples are lower than at any time during the year. There is, however, a very hopeful feeling in regard to next season's business, the volume of which it is anticipated must be gratifyingly large. The improvement in the financial situation is to be noted. The fact that a great deal of the money realized from the crops has been devoted to the removal of indebtedness rather than to the purchase of goods, while diminishing the volume of business of the season now closing, gives excellent promise of a healthy condition in the future, which will serve as the basis for the large demand which is regarded as sure to come. The special reports which follow will be perused with interest as reflecting the condition of trade in the leading centers. The matter of the classification of Hardware, which is discussed by our Philadelphia correspondents, is certainly deserving the most careful attention of the trade.

Chicago.

(*By Telegraph.*)

With the approach of the close of the year the demand for Shelf Hardware shows a diminution. Orders are merely for sorting up and not running into stock accounts. Jobbers of Tinware and House-Furnishing goods report their trade now at a standstill, as usual at this season. A fair volume of business is being done in Heavy Hardware, but here also the demand is affected by the approach of the inventory period. With regard to the future everybody expresses the utmost confidence, and January is expected to develop a heavy business. Collections are unusually good.

St. Louis.

(*By Telegraph.*)

Hardware trade continues to show a gradual falling off as we approach the end of the year. The demand for holiday goods is steady, but outside of this business is not very active. The Southern trade does not improve and jobbers are devoting their attention to the trade in the West and Northwest, and while a large business has been done in that territory, prices have not been entirely satisfactory. Shelf Hardware continues in good demand but Heavy Hardware and Builders' Tools show a decided falling off. Wire Nails are selling freely at very low prices. Cut Nails are not so active. Collections do not improve to any extent.

Louisville.

W. B. BELKNAP & CO.—General business, while not altogether dragging, is apathetic and lifeless, as regards the great staples. There is no prospect of a turn in the market, hence buyers are indifferent. Of course such turns come when people least expect them. Business in these heavy goods will naturally be quiet until after the first of the year, when, if the accumulated money in the larger cities begins to seek investment, we shall doubtless see a better movement.

Already some signs of this are manifest. A number of letters have been received by the larger firms and financial institutions here from Eastern capitalists offering funds, which would indicate a growing ease and confidence in many centers. There is a very close scrutiny of credits, however, and less inclination to take risks than ever before. Owing to the defective laws in many States and the readiness with which a business trader can close out his entire stock and leave nothing to his creditors, sellers are not unnaturally cautious and suspicious.

One favorable feature in the situation is the general employment of labor. We hear very little complaint of people who are willing to work being out of situations. While Christmas gifts may not be as elaborate as in certain former years, they promise to be none the less numerous.

Baltimore.

CARLIN & FULTON.—The condition of business remains about the same as when we last wrote you. In our southern market there is little disposition to buy, the merchants there awaiting the greatly hoped for improvement in the price of cotton to enable them to meet their present obligations and are buying only as necessity compels them; in our more immediate vicinity the approach of Christmas has stimulated trade somewhat for such lines of goods as are appropriate to the season, but we notice generally a very conservative policy being pursued in buying. It is to be hoped that with the new year, after inventories have been taken and accounts liquidated, trade will revive, but for the present we are compelled to exercise patience and hope to soon realize the beneficial results of the great crops now being marketed.

Cleveland.

THE W. BINGHAM COMPANY.—Since our last report there has been no material change in the situation, except, perhaps, that the holiday feature has become more marked. The orders coming in show a good general trade throughout the country and also develop the fact that the average dealer is putting into his stock only what he requires for his immediate wants, evidently not desiring to increase the amount invested in his business until after the annual inventory, and one would judge that the new year would be begun with good, clean stocks in the hands of the retail merchants. Orders for holiday goods show a marked increase over former years, partly due, no doubt, to the large additions made to the line of Fine Cutlery, &c., and the growing appreciation of the fact that a Hardware store contains many articles suitable for a Christmas gift. City dealers have enlarged their stocks of such goods to meet the growing demand and find an increased business resulting. Nails are selling freely at $1.80 for Wire and $1.65 for Cut, from stock. Fence Wire is quiet.

Portland, Ore.

FOSTER & ROBERTSON.—Contrary to expectations, the volume of business for the month of November, just closed, did not equal that of the same month last year, and the indications for the month of December are of about the same character. Collections, which under favorable circumstances ought to be excellent at this season of the year, in view of the prosperous condition of the farming community, fall considerably short of expectations, but this condition of affairs we regard as but temporary, and look for material improvement as soon as the rains cease. Prices remain reasonably firm, with no changes whatever since our last letter.

Omaha.

LEE-CLARKE-ANDREESEN HARDWARE COMPANY.—The gratifying condition of affairs among the jobbing trade of this center still continues, as noted in our last report. Prospects are still regarded as most favorable, and promise an active trade through the winter months. The volume of goods moving is large, amounting in some lines to a positive rush. While this is in the main due to the improved conditions prevailing in the coun-

try, as the result of abundant crops, there is also another important factor to be taken notice of. During the dull times last year consequent upon loss of crops, local jobbers sought an extension of territory by pushing out and opening new fields for trade. In this they have been entirely successful, and are now reaping the fruits of the extended efforts. The railroads are taxed to their utmost capacity, and a shortage of rolling stock is continually reported. The immense amount of freight offering for transportntion, it is expected, will swell their earnings and increase dividends as well as enhance the values of their stocks and bonds, which would naturally have the effect of stimulating these important factors in the world of commerce to increase their system by extension and general improvements throughout. On prices we hear of no important variations. Certain staple lines of Heavy Hardware still rule abormally low, considering the great activity of trade, and it would hardly be a matter of surprise to any one interested if the manufacturers of some of these particular lines suddenly realized the situation, ceased their strife and prices took a jump in the night.

Boston.

BIGELOW & DOWSE.—Trade continues very satisfactory and sales so far this month compare favorably with last year. There have been but few changes in prices. There is increased inquiry for prices on Steel Cut and Wire Nails. Evidently buyers are inclined to take advantage of the extremely low prices now ruling. Warmer weather has lessened the inquiry for Skates.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—There has been no marked change in the state of trade during the last two weeks. The favorable conditions of the weather have stimulated the retail trade in some departments, but for the same reasons seasonable goods, in the hands of the jobbers, thus far have not been as active as is usual this time of the year. Considering the lateness of the season, however, trade, as a rule, has held up fairly well. The trade in holiday goods has been reasonably active. There are no important changes in prices. Wire Nails are now being offered at ridiculously low prices; indeed, at prices considered inconceivable a few months ago. Competition on this line seems to have forced prices to the level of manufacturing cost. Manufacturers as well as jobbers are beginning to inquire why railroad rates of freight on these goods can remain unchanged. Many goods in the line of Hardware are at present being sold without profit, others with a very small margin of profit, and the valuation or selling price is about one-half of what it was a few years ago. The basis of freight rates was originally established according to the bulkiness and value of this line of goods. The rate of freight has not been reduced to correspond with the value of Hardware, although the facilities in shipments are far greater and the mileage expense of transportation is less now than when originally classified. There is unquestionably great incongruity in this state of affairs, and if there is any value to the community in the muddled Interstate law, there certainly is nothing that requires greater attention at the hands of commissioners. According to a recent statistical report of the Interstate Commerce Commission on the conditions and operations of the railroads throughout the country, is was shown that the difference between the actual cost of carrying 1 ton of freight 1 mile and the actual revenue for the same was 33¼ per cent. profit on the receipts, or 50 per cent. profit over expense account. The report being as follows: The cost for carrying 1 ton of freight 1 mile was $\frac{6.1}{100}$. The revenue for carrying 1 ton of freight one mile was $\frac{9.5}{100}$.

It is no wonder there has been of late the absorbing interest in the railroad earnings, which have simply been enormous, nor is it any wonder that a smile can be seen playing over the faces of the holders of stock as they peruse their daily report of increased railroad earnings. In the official report of the railroad earnings of September the average earnings are about 10 per cent. greater than one year ago, and one year ago the same percentage of average was 10 per cent. greater than the preceding year. Since that date there has been a further increase in the earnings, and the leading grain-carrying roads show an increase of 20 per cent. and the coal and iron carrying roads show an increase of about 15 per cent. This is likely to increase rather than diminish. The traffic for the next few months will largely surpass any previous record. Statements come pouring in, showing the extraordinary shipment of grain. Stupendous blockades of freight awaiting shipment are located at various Western points, with bright prospects of improved condition in every location. The shipments of coal and iron are enormous, cotton quite equal to last year, and wheat and corn shipments unprecedented. But are the manufacturer, jobber, retail dealer and consumer, who depend upon their yearly earnings, benefited by these increased railroad earnings? As a rule, the class of the community who receive the benefits of this profit on the stock they hold in these corporations are neither taxed by mental or manual labor, but are only interested in stock they hold. To-day Hardware is being placed upon the market by the manufacturers, who, as well as the jobbers, think they are very fortunate if they can realize 10 per cent. profit, and the rate of freight, as it now exists, a few years ago, on its then valuation to a given point, would be 3 per cent., but now, owing to the reduced price of goods, would by the same rule cost 6 per cent. on the valuation. Besides, formerly the railroads were liberal in the construction of their classifications, and manufacturers and jobbers were instructed to make their shipments of Hardware to conform with certain goods embraced in their shipments, like Strap and T Hinges, Cast Butts, Bolts, Spring Door Hinges, Iron Screws, Barn Door Hangers, &c., which come under fourth-class classification.

Therefore, with that liberality in shipment, the percentage on valuation to a certain point before us was about 2 per cent., whereas, by the strict construction, which excessive prosperity is always apt to demand, the smallest article not embraced in the line of Hardware classifications increases it to a higher classification, and brings the percentage above the 6 per cent. referred to.

Freight classifications on Hardware read as follows: "Note.—All articles of iron or steel manufacture, when fitted, painted, japanned, bronzed, coppered, acid coppered, plated, tinned, galvanized, or when joined together, in the rough, will be considered as Hardware and classified accordingly, unless otherwise specified in the classification."

Whereas Rule 15 in the classification reads as follows: "Any package containing articles of more than one class will be charged at the tariff rate for the highest classed article contained therein."

Thus one small article, weighing perhaps 1 pound, will increase the entire classification of a box weighing 400 pounds. In view of these facts, through business considerations, it does certainly seem a proper time for an adjustment of these classifications of merchandise, especially on Hardware. With a strict adherence to present classifications it is impossible for either manufacturer or jobber to do business and make satisfactory shipments, in strict justice to his customer, with the present discrimination; owing to the fact that a mixed assortment of Hardware is liable to come under classification never originally intended; now fourth-class Hardware, together with third-class Hardware, are liable to come under a higher classification, and special shipments of these goods cannot be made, because the weight contained in the shipment of these combined articles would frequently weigh but a small amount, while Rule B, "No single package or small lot of freight of one class, classified first class or lower, will be taken less than 100 pounds, at the class to which it belongs." Therefore, a few Augers, Chisels and Squares, as an illustration, kept out for a separate shipment, must go at the cost of 100 pounds, even if it only weighs 25 pounds; or if placed in the box of Hardware, it must increase the Hardware to a corresponding classification. The reason given, a few years ago, by the railroad agents, why their instructions to make shipments of Hardware to conform to certain articles in the Hardware line, and thus come under fourth class, was that the classification required some change, and temporarily this answered the purpose. If these reasons existed then, they certainly exist now, when a strict construction is put upon the lighter lines of Hardware to raise the freight to the first or second class, instead of diminish it to the fourth class, as it was a few years ago.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—We have gone into our new quarters and are now very busy getting the buildings into such shape as to enable us to work with facility and economy. Our store covers 100 feet front on one of the principal wholesale streets. The building is 130 feet deep and has five stories and basement. We are compelled to put in a good deal of work in fitting up the building for satisfactory use, and it will require at least 30 days for us to be in good working order. When our arrangements are completed we shall have larger facilities for handling our business than we had in our former premises.

The insurance adjusters are at work on our loss, and we shall probably have an adjustment in a very few days. The weather has been very favorable this week, much of a contrast with that of last week. Collections are fair, but not so good as they ought to be, and as they would be if it had not been for the interruption to farmers' work by last week's severe weather. The general conditions of trade are favorable, and the year will close satisfactorily to jobbers here generally.

Notes on Prices.

Cut Nails.—The Cut-Nail market continues in a sluggish state, with only a moderate demand. The general quotation for Iron or Steel Nails, in round lots, at factory, is $1.45, but this figure is shaded on desirable orders. Some of the mills, however, are holding the prices firmly. New York quotations are $1.55 to $1.60 on dock, the price for small lots from store being $1.65 to $1.75.

Chicago, by Telegraph.—Cut Steel Nails are not active, owing to the time of the year. But occasional orders for carloads to 1000 keg lots are being received by factory representatives. More or less irregularity in prices is reported on the part of outside makers, but the local manufacturers are adhering to their quotation of $1.65 on 30-cent average, at which they report a satisfactory volume of business. Small lots from stock are still selling at $1.75.

Wire Nails.—The quotation for carload lots at mill continues $1.70 to $1.75, but recent sales have been made at considerable concessions from these figures, Nails touching a point which would have seemed incredible a few months ago. The market is, however, regarded as having for the time at least recovered tone, and the prices above given represent current quotations, but it is lacking in strength and the mills are generally desirous of selling. Small lots from store are held at $1.85 @ $2, according to location and circumstances. Some of the mills are showing a disposition to sell relatively small lots at only a moderate advance on carloads.

Chicago, by Telegraph.—The interesting fact now transpires that one of the leading manufacturers recently unloaded a quantity of Wire Nails approximating 100,000 kegs in the Northwest. As a matter of history it may be stated that the price is reported to have been $1.60 rates at factory. Since then there has been a general stiffening of prices along the line and the manufacturers in that section are uniformly quoting a rate equal to $1.85, Chicago, which is for immediate shipment only and does not hold good beyond this month. Jobbers quote carload lots at $1.90 and small lots at $1.95 @ $2.

Barb Wire.—The Barb Wire market continues without special feature. Prices are well maintained, but the volume of business is not heavy. Rumors are current that an advance may be anticipated before long, but in view of the condition of the market and the prospect of competition outside of the Columbia Patent Company the trade are disposed to regard an advance at the present time as improbable.

Chicago, by Telegraph.—The Columbia Patent Company report a better business in progress than is usually expected at this season. Orders for 20 carloads were received in one day this week. No change in prices is contemplated by the company in the immediate future, but matters are so shaping themselves with regard to the few manufacturers outside that the managers of the company are quite confident that in a short time they will be able to control the entire trade. To do this it may be necessary to make some slight changes in the plan on which the company were organized, so that all interests may be harmonized. Quotations by jobbers are unchanged. They report a very light trade.

Curry Combs.—In accordance with the policy of the American Curry Comb Company, to which we have already referred, the consolidation of interests which they represent enables them to diminish the number of Combs formerly made by the different manufacturers, their effort being to have the various factories produce certain patterns to the exclusion of others, thus systematizing and simplifying the production of the goods, with advantage, it is hoped, to both the company and the trade. Their new catalogue is not yet issued, and the company are for the time being quoting by the former numbers of the different manufacturers represented by them.

Glass.—The demand for Glass is very light, and the output is restricted by the trouble connected with changing from natural gas to converters for the manufacture and use of artificial gas. Artificial gas-making is still in its experimental state as applied to Glass furnaces, as the reasons are not known why everything works smoothly for two or three days and then for two or three days there is no end of trouble. The operators are not as a rule in favor of experimenting with new appliances, and do not exert themselves to discover and overcome the difficulties. If a brisk demand characterized the market at this time, fancy prices for Glass would doubtless rule. While it is intimated that prices will be advanced after January 10, the manufacturers are likely to pursue a conservative course until there is an unmistakable increase in the requirements of purchasers; or until some plan can be put upon a working basis whereby prices, labor, output, &c., are under the control of an association or trust. Quotations remain unchanged as follows: American Window Glass, in carloads, 80 and 10 and 5 per cent. discount; less than car lots, 80 and 5 per cent. discount; French Window Glass, 75 and 10 per cent. discount; American Plate is held at a discount of 50, 10 and 5 per cent., and Imported Plate at a discount of 60 per cent.

Inventory Taking.

IN FURTHER DISCUSSION of this important matter, which, at this season of the year, is receiving the attention of merchants in all parts of the country, we have the following communication from a well-known Connecticut house. It will doubtless be found of especial interest and value, giving as it does a full description of their methods:

For greater convenience in handling we have our inventory book made up in 15 sections or pamphlets of 24 pages each, with heavy manila coverings, the whole to be bound into one volume when completed. The size of the book is 14½ inches by 9 inches wide, 40 lines to the page. By this arrangement we could put some half a dozen or more clerks at work at the same time. One set, for instance, taking account in the fourth story and another on the third floor, while on the main floor all hands could be kept busy. It was called off and written in ink directly into these sections and called back. When a section was filled it was handed in to the office for pricing and extending and then to a fresh hand to examine. Thus, we could have writing in, pricing, extending and examining all going along at the same time and by different clerks.

We began writing in Section 2, page 25, reserving the first section for a general index, recapitulation, inventory footings, corrections of errors, memorandum of goods on sale, &c., and for store fixtures. We always footed each page by itself, never carrying forward. In correcting errors, the original figures are not disturbed, but the error is noted in the margin in pencil and circled thus: (Add .96) or ($1.54 deduct). We enter the inventory footings page by page, in order, in Section 1, as soon as extended and footed, and the "Errors to be added" in the same way on a page by themselves, and "Errors to be deducted" also by themselves. It is surprising how many different ways errors will occur, to be unearthed by a competent and careful examiner.

In Section 1, first came the index (page 1), which ran about as follows:

SECTION 1:	Pages.
Inventory footings	6
Errors to be added	10
Errors to be deducted	11
Goods not belonging on inventory	12
Store fixtures	16
SECTION 2:	
Fourth floor—Back room	25
Front "	27
Third floor—Back "	31
Front "	35

SECTION 3:

Second floor—East side shelving	51
West " "	69
End "	74
Floor space	79

The leading lines, such as Machine Bolts, Shot, Hinges, Coal Hods, &c., also the Showcases, were also indexed in their order.

The recapitulation was merely for our gratification. It gave the total value of the goods upon each floor and included also values of the leading lines on those floors, such as Nails, Axes, Rope, Paper, &c.

The final inventory figures were made on the last page of the inventory footings in Section 1, and arranged as follows:

Total amount inventory footings	$18,000
Errors to be added	350
Total	$18,350
Errors to be deducted	175
Total	$18,175
Deduct inventoried goods sold before January 1	275
Total	$17,900
Add goods sold after January 1 not inventoried	125
Total	$18,025

From this last amount it has been customary to make a discount of 5 to 10 per cent. to cover shrinkage on old, unsalable stock, imperfect and damaged goods, rusty goods, &c. Although the inventory is figured at market prices at time of taking, on all leading lines and makes of goods on retail stocks of Shelf Hardware, good, bad and indifferent, and on odd lines, the cost marks on the goods will have to be used.

Writer noticed in your December 3 issue a request for different forms used by your readers in determining the profits for the year.

We suppose in double entry the bookkeeping of it is about the same with everybody. We have been accustomed to balance our books for the year as far as merchandise and profit and loss accounts are concerned as follows:

Merchandise.	*Dr.*	*Cr.*
To balance (inventory, 1/1/91)	$18,000	
By purchases for 1891, posted into this account from the journal monthly	68,000	
By sales from 1891, as posted into the account from the blotter monthly		$81,600
By amount of inventory 1/1/92.		18,025
To balance to profit and loss account	13,625	
Total	$99,625	$99,625
1/1/92. To balance account, contained in inventory	18,025	

Profit and Loss.	*Dr.*
Bad accounts (entered separately)	$375
Interest	1,200
Freight and cartage	1,500
Pay roll account	4,500
Advertising	250
Salaries of partners	2,500
Postage account	250
To balance account	8,720
Total	$19,295

Credit Side.

1/1/91. By balance account	$5,670
1/1/92. By merchandise account	13,625
Total	$19,295
1/1/92. By balance account	8,720

We begin to inventory the day after Christmas, and by New Year's are perhaps a little more than half through the stock.

Trade Items.

WE ARE ADVISED that the Commissioner of Patents has again, after the customary appeals and rehearings, finally decided in favor of the Peters Cartridge Company, Cincinnati, Ohio, for whom J. C. McCarty & Co. are agents, 97 Chambers street, New York, against the Standard Cartridge Company of Chicago. This is the case in which the Peters Cartridge Company claimed that Cartridge loading machines manufactured for the Standard Cartridge Company and used by them infringed upon the claims and patents of the Peters Cartridge Company. These decisions of the Commissioner of Patents are referred to as making the Peters Cartridge Company the sole owners in the United States of the large power Cartridge loading machines in question.

THE TRADE WILL OBSERVE the advertisement of Stanley Works, New Britain, Conn., and 79 Chambers street, New York, in which they illustrate their enlarged line of Corrugated Hinges, showing some of the goods which they are making in polished brass. A further reference to this line will be observed among our Hardware Novelties in this issue.

AT THE RECENT MEETING of the Northwest Missouri Editorial Convention, which was held in St. Joseph, November 21, a number of the leading manufacturing establishments of that city were visited by the delegates. Among those visited was the St. Joseph Pump Company. Here an elegant luncheon was served, consisting of sandwiches, olives, celery and sweet Missouri cider. The novel feature of the luncheon was a large glass cistern filled with cider, with a Perfection pump—which they manufacture—arranged in perfect working order, pumping the cider as fast as the thirsty visitors could drink it. The delegates were shown through the entire plant, and expressed themselves as much pleased with the rapidity as well as the thoroughness with which the pumps were turned out.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn., are distributing their 1892 calendar, which is an artistic production of merit, comparing favorably with those of preceding years. It is a metallic-end hanger, about 18 x 23 inches, in gilt and colors, the illustrations representing hunting scenes. The one at the top, extending across the entire width of the sheet, is a mountain scene by Fredrick Remington, in which a long distant shot is about to be made. The detail in costumes, guns, &c., is noticeable for the same accuracy which characterizes all his pictures. Below and to the right of the calendar sheet is a cowboy on a broncho, and across the bottom of the sheet is a lake scene, in which a deer is being shot from a canoe. The calendar sheets are large enough to enable the dates to be seen at a distance.

THE YALE & TOWNE MFG. COMPANY, Stamford, Conn., have arranged with the firm of Jno. Williams, art metal workers, 544-556 West Twenty-seventh street, New York, to have their extensive facilities and experience available to them for the production of grille work, in iron, brass and bronze; of statuary bronzes, and other allied products, thus placing the company in a position to undertake orders for art metal work of almost every kind. The development of their business in fine hardware and metal work reached a point where it involved grille work and ornamental bronzes, in which they have already done considerable work, including of late some important and very beautiful productions from the special designs of prominent architects. The facilities of both concerns are now united and will be utilized in the future conduct of a business which will cover the whole field of wrought metal and statuary work as applied to the equipment and decoration of buildings.

P. W. GALLAUDET, who was for many years head of the well-known Stock Exchange firm of P. W. Gallaudet & Co., has taken an office in the United Bank, Broadway and Wall street, for the purpose of carrying on a business in commercial paper and in stocks and bonds on commission. William R. Cox is associated with him.

WM. SHOVE announces that the business heretofore conducted by him at 200 Market street, Newark, N. J., as jobber of Hardware Supplies, has been sold to a new firm, Roe & Conover, who will sign in liquidation and collect the assets, and pay all the debts of the former firm.

THE WHOLESALE Cutlery business of the Robert M. Diaz Company, 69 Pearl street, Boston, has been bought by Libby, Harlow & Fenn, who will succeed the former concern January 1, 1892.

Price-Lists, Circulars, &c.

SYRACUSE CHILLED PLOW COMPANY, Syracuse, N. Y.: Chilled Plows, Sulky Plows, Walking Gang Plows, Shovel Plows, Wheelbarrow Grass Seeders, Harrows, Cultivators, Road Scrapers, Horse Hay Forks and Carriers. They have increased their plant to nearly double the capacity of last year, and refer to their facilities and complete machinery, particularly in the foundry and forge shop.

NEW HAVEN HARDWARE COMPANY, New Haven, Conn.: Whipple Door Knobs. The Knob is locked to the spindle by means of a latch secured to the neck which drops into notches in the Knob, thus locking the Knob, the neck and spindle together; preventing the Knob from turning on the spindle, when attached to the door. The point is made that by the use of this Knob screws are dispensed with, and the Knob is adjusted exactly to the thickness of the door without the use of rings or washers.

L. A. SAYRE, Newark, N. J.: Ice Creepers. Illustrations are shown of the Jamestown, Hudson River, Mackinaw, Rival, Security, Eclipse, Kennebec and Instep. These are made, in some styles, for the use of both ladies and gentlemen, and are adapted for all requiring ice creepers.

ST. LOUIS RAILING WORKS, St. Louis, Mo.: Bankers' Catalogue. A number of designs in Ornamental Railings, Panel Grilles and Office Metal Work, are arranged in this catalogue for reference. Attention is called to the fact that the variety of forms into which this work is made is without limit, and that if suitable designs are not found, special drawings will be submitted to fulfill peculiar requirements. The designs shown combine neatness and strength, and cover a large variety of work.

BELKNAP MOTOR COMPANY, Portland, Maine: New Electric and Water Motor Cyclone Coffee Mill. The Electric Motor is 1 horse-power and is built for a 110 volt current, the wires coming through the floor into the base of the mill, where the Motor is placed. The mills stand about 6 feet high, with small balance wheels set high, the hopper and balance wheels being nickel plated. The mill grinds 4 pounds of coffee per minute.

WALTER W. WOODRUFF & SONS, Mount Carmel, Conn: Carriage Goods. Their 1892 catalogue contains 87 pages, illustrating and giving prices of Rim Bands, Shaft, Pole and Whiffletree Tips, Carriage Door Handles, Malleable Coach Hinges, Top Props, Felloe Plates, Ox Shoes, &c. The catalogue is handsomely printed on excellent paper, and will be received with pleasure by the trade.

Arrangement of Stores.

W. A. GUENTHER & SONS.

PART II.

THE SHELVING on the left of the entrance is used for House-Furnishing Goods, Tinware, &c., as shown in Fig. 702.

Fig. 702.—Tinware Department.

The shelving is 16 inches wide and extends 11½ feet from the floor. The base or ledge shelf extends beyond the shelving 14 inches, while the shelves above are spaced

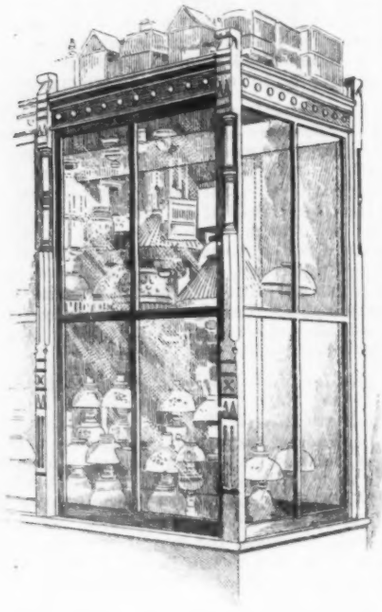


Fig. 703.—Lamp Case.

to suit the goods which they hold. Under the ledge and running back 60 feet are two rows of drawers 30 x 36 inches. The top row is 11 inches deep and the bottom row 12 inches deep. These drawers, 40 in number, are each made to hold a full case of Lamp Chimneys from which to supply their retail trade, and are all provided with neat bronze pulls and label frames. Beyond the drawers is 24 feet of shelving for Fire Shovels, Pokers, Tongs, Elbows and Stove Pipe. Brass door pulls are fastened to the shelf standards, 12 feet apart. Below each, on the base and between the drawers, are fastened cast steps, to enable one to step to the ledge without trouble. It is designed to have traveling ladders to reach the top shelves of Tinware. The counters in front of shelving on each side of the store have drawers for Lamp Goods, &c., all the drawers being mounted on sash rollers to avoid friction when opening and closing them. In the center of the store near the front is a large Lamp case 18 feet long, 4 feet wide and 11½ feet high, a part of which is shown in Fig. 703. In this is shown from 35 to 40 Hall and Library Lamps and a large assortment of Vase and Stand Lamps. This manner of showing Lamps keeps them from the dust and flies, besides presenting an attractive appearance. The office, Fig. 704, located in the rear of the Lamp case, is 12 by 30 feet, inclosed with paneled woodwork, with gates on either side in the rear, by which it is entered. The desks are arranged for convenience, and are provided with drawers or cupboards underneath, for stationary, advertising matter, catalogues, &c. In addition to these are two catalogue cases containing catalogues of everything in or out of their line. The general arrangement of the second floor is shown in Fig. 705, the space being well occupied by bins, shelving, &c., for the accommodation of various lines of goods, and is reached by stairs from the rear of the first story. On the left side of the room is 95 feet of shelving, reaching to the ceiling. The first shelf is 3 feet 3 inches from the floor, and 3 feet 9 inches wide, affording a 9-inch ledge to stand on to reach the goods above. Under this shelf bundles of goods, Coal Hods, &c., are stood. The shelving is used for Pieced, Stamped and Japanned Ware, also for Granite Ironware. In front of the shelving and near the front of the room are two sections of bins, each 15 feet long by 7½ feet high and 6 feet wide. These are arranged on one side for Post Hole Diggers, Garden Tools and Forks, while on the other side Tinware is accommodated in case lots. All the bins on the second floor are made of tongue and grooved flooring, stained a light cherry color and varnished. In the rear of the

Fig. 704.—Office and Desks.

bins is a skylight opening 6 x 15 feet, the size of the skylight overhead, which admits light to the first and second floors. Next, back of the skylight, is a 24-foot section, with bins on both sides for Rakes and Planter Hoes. These bins are each 7½ feet high, 3 feet wide and 3 feet deep, a portion of which are shown in Fig. 706. On the left of the center division wall is a section of bins 51 feet long, with three tiers of bins, as shown in Fig. 707. The lower ones have sliding covers and are used for Eye Hoes, Mattocks, Grub Hoes, Game Traps, &c. On the right side of the division wall is a corresponding section of bins devoted to Shovels, Spades and Scoops. The tops of all these bins are utilized for full packages of Horse Collars, Lard Cans, Jacket Oil Cans, Scales, Coffee Mills, &c. Along the right side of the room is a 50-foot section of bins for Mantel Grate Frames, Fenders and Summer Fronts. Over this section and extending 20 feet beyond is a hanging shelf 5 feet wide for

Stove Pipe, Elbows, Cradles, Scythes, Snaths and other goods. An excellent feature is embodied in the straw bin, 5 feet deep, 10 feet long and 7½ feet high. This has a covering of Iron to prevent any possibility of fire. Goods are packed for shipment in this part of the room convenient to the elevator. The mantel room, 18 x 20 feet, is arranged to display about 30 Mantels, and eight sizes and styles of Mantel Grates. The room is carpeted and tastefully decorated with Brass Goods, Coal Vases, Ornaments and Mantel Cabinet Mirrors, making an attractive room, and adding to the sale of goods in this department. The room to the left of this is used for Screen Doors and Windows, also as a storage room. Harness is exhibited near the mantel room, while the space through the center of the room is used for full cases of Tinware. A 6 x 15 foot skylight overhead lights this part of the room, and two skylights in the rear admit light to the first and second stories. In the rear of the second story, extending across the entire building, is a room 23 x 43 feet, used for storing Stoves, having a capacity of over two carloads of these goods. In this room accommodations are provided for Sheet-Iron Stoves, Step Ladders, &c. Above the storeroom is the tin shop, being the third story part of the building, 23 x 43 feet in size, lighted on three sides, and far enough from the first floor to avoid annoyance from noise. Three or four men are employed in the shop, and convenient racks are provided for Tin Plate, Sheet and Galvanized Iron, also hanging shelves for Gutter Spout and other stock.

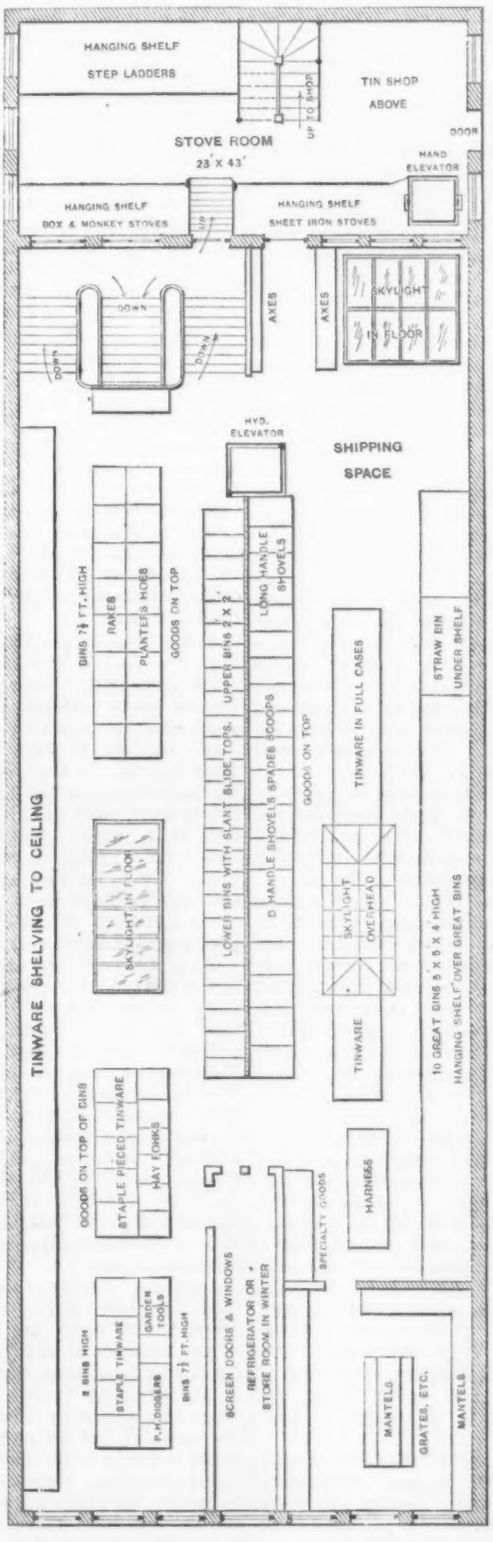


Fig. 705.—Plan of the Second Story.

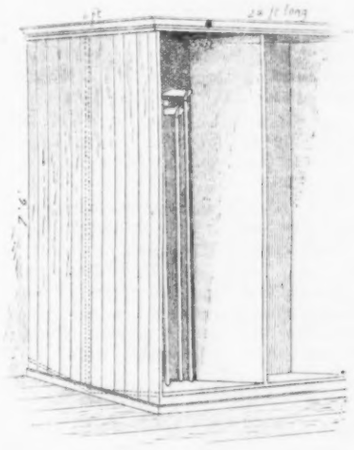


Fig. 706.—Bins for Rakes and Planter Hoes.

The shop is reached by stairs from the stove room, also by hand elevatorfrom the basement. In the arrangement of the whole store one cannot but notice the provision made for each line of goods, together with the completeness of detail in each special case. The store contains over 18,000 feet of floor space, and much

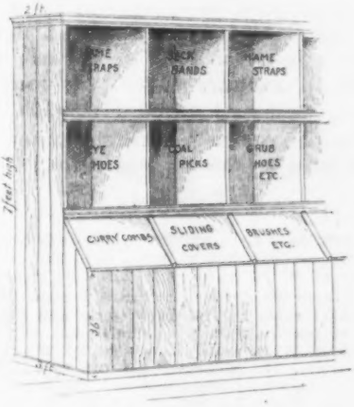


Fig. 707.—Bins with Sliding Covers.

thought has been required to satisfactorily accommodate the large and varied stock carried.

It Is Reported—

That there is an opening for a Hardware store at Keokuk Falls, Oklahoma.

That Robert Mansfield has purchased a half interest in the Hardware business at Rolling Home, Mo.

That C. W. Boyd is going to open a Hardware store at Lake Park, Iowa.

That Smith & Johnson, Fremont, Ohio, have taken possession of their new Hardware store.

That the Hardware store of Barnett, Ross & Co., Eufaula, Ala., was burglar-

ized on the 8th inst., and 15 Guns, some ammunition and a number of Pocket Knives taken.

That C. Frederick has purchased the Hardware stock of A. E. Copper of Center Village, Pa.

That the Colfax Hardware Company, Colfax, Wash, will erect a large brick block in the spring.

That J. W. Evans & Co., Webster City, Iowa, have moved into their fine new store.

That in a fire at New Richmond, Wis., on the 8th inst, the Hardware stores of O. J. Williams & Co. and A W. Bosworth, Jr., were destroyed, the former losing $6000 and the latter $7000.

That John Schmidt, Jr., will open a general Hardware business at Berkeley, Cal., next month.

That the new building which is being erected by the Oroville Hardware Company, Palermo, Cal., will contain a hall 66 x 150 feet.

That J. E. Nelson has commenced the Hardware business at Jonesboro, Ind.

That O'Brien & Maxfield, Edward Martin, E. W. Leete, W. H. Walling, M. E. Loveland and Jebo & Irish, Hardware dealers, Potsdam, N. Y., have agreed to close their stores at 8 o'clock, from December 1, 1891, to March 1, 1892.

Trade Topics.

Inventory.—Our readers will doubtless be interested in the article on "Taking Inventory" in another column, as it comes from a prominent Hardware firm, and is worthy of careful perusal. It contains valuable suggestions, particularly regarding arrangement of the inventory books, the manner of facilitating stock taking and figuring, and also in the stated condition of the business at the end of the year. These plans may be modified to meet the requirements of smaller stocks and less help if double-entry books are kept. We should be pleased to receive for publication plans for taking inventory and of figuring the profit or loss in use by firms who carry stocks of $5000 or less, and who keep single-entry books. The matter is one of universal interest to the trade, and contributions on this subject cannot fail to bring out valuable suggestions.

Exports.

PER SHIP J. D. BISCHOFF, NOVEMBER 27, 1891, FOR SYDNEY, N. S. W.

By H. W. Peabody & Co.—2 cases Carriage Hardware, 3 cases Hardware. 2 cases Guns, 4 packages Sandpaper, 3 boxes and 2 cases Hardware, 2 barrels Grindstones, 400 reels Barb Wire, 4 cases Hardware, 2 boxes Lamp Ware, 59 packages Hardware, 1 dozen Wringers, 3 cases Guns and Implements, 1 case Money Drawers, 6 cases Sifters, 3 packages Ladders, 3 packages Hardware, 3 cases Carpet Sweepers, 1 case Wire Ware, 3 cases Hardware, 2 cases Rivets, 1 package Curriers' Tools, 4 cases Wringers, 5 packages Hardware, 3 packages Whetstones, 2 cases Hardware, 2 cases Hose, 5 packages Household Utensils, 10 packages Hardware.

By Strong & Trowbridge.—2 packages Hardware, 1 case Clips, 6 cases Axes, 6 cases Hardware, 22 packages Lampware, 1 case Tacks, 1 case Locks, 1¼ barrels Emery Wheels, 1 case Tools, 1 case Traps, 3 cases Knives, 1 case Chucks, 1 case Washers, 4 cases Nails, 3 cases Bolts and Nuts, 8 Refrigerators.

By R. W. Cameron & Co.—79 cases Tools, 4 cases Nails.

By McLean Bros. & Rigg.—1 case Hammers, 5 cases Carpet Sweepers, 1 case Oil Cans, 1 case Lanterns, 3 cases Hammers, 10 cases Bush Hooks, 8 cases Churns, 2 cases Potato Mashers, 4 cases Scales, 3 cases Rat Traps, 2 packages and 1 barrel Braces, 6 cases Forges, 2 cases Bench Wringers, 4 cases Tacks, 18 cases Meat Choppers, 2 cases Mouse Traps, 4 cases Wringers, 20 cases Axes, 6 cases Picks, 39 cases Axes, 7 cases Hatchets, 2 cases Bird Cages, 1 case Primers, 5 cases Emery Wheels, 2 cases Egg Beaters, 1 case Padlocks, 2 cases Wrenches.

By R. W. Forbes & Son.—4 dozen Bush Hooks, 2 cases Carriage Hardware, 2 cases Bolts, 1 box Belt Studs, 9 boxes Plows and Harrows.

By R. W. Cameron & Co.—2 boxes Grinders, 3 cases Tools, 1 barrel Emery Wheels, 4 cases Tools, 1 case Hardware, 2 boxes and 3 casks Lampware.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

There have been no new developments in any branch of the market during the past week. Weather conditions have favored outdoor work, and incidentally the spread of Paint, but in the demand for Leads or Colors nothing indicative of a larger consumption than customary at this season of the year by housepainters has been experienced. In several lines of prepared Paints adapted for special uses there continues to be a good steady trade, however, and the distribution of the same seems to be somewhat ahead of the December average. Values all along the line stand practically as quoted for several weeks past, and in the existing conditions there is nothing suggestive of any radical changes in the immediate future on either base materials or the manufactured goods.

White Lead.—The transformation of the National Lead Trust into a stock company under the laws of the State of New Jersey has in no manner affected the workings of the combine, and old list prices and terms are adhered for the product of the various corroding establishments. Outside brands of carbonate and the various mixtures are likewise without change, as far as the manufacturers' prices are concerned, and the special rates on pure Lead made by jobbers differ in no marked degree from those that have been made since the beginning of the month. The general demand is slow, but compares favorably with the usual run at this season of the year.

Zincs.—The movement of American Oxide is chiefly in the form of deliveries on old contracts, which serve to take up the greater portion of the current output. Not many orders have been placed latterly for delivery the coming year, but most manufacturers have a good deal of business in hand, and some have practically all of their low-grade product under contract to the Standard Oil Company. There is no friction in any quarter, and prices therefore remain very steady. Foreign brands are in limited demand here at present, but the home markets are represented as being quite brisk and prices remain firm on both sides of the Atlantic with the tendency toward a higher level.

Red Lead and Litharge.—In Red Lead there is still a very fair business passing, although sales are not as heavy just now as they were early in the month. Glassmakers' Litharge is in fairly active demand for forward delivery, and is firm at 5¼¢ for ordinary and 6¢ for double refined. Powdered is quiet and without change in value.

Orange Mineral.—Manufacturers of artificial Vermilion are placing some orders for supplies required during the early portion of the year, but the demand from other sources is momentarily slow.

Colors, &c.—Outside of a jobbing movement of merely fair proportions there has been very little doing in dry Colors the past week. Grinders appear to have made ample provision for their probable requirements during the early part of the coming year, and dealers are buying house painters' Colors only as imperative wants may necessitate. Oil Colors are also in limited demand, and ready mixed Paints, with few exceptions, remain quiet.

Miscellaneous.—Block chalk is without radical change; very little supply has come forward and that was disposed of at former prices. The demand for Whiting rurs remarkably good, considering the season of the year, and prices for the various grades remain steady. Putty is without change.

Oils and Turpentine.

The market for nearly all lines of Animal and Vegetable Oils has been characterized by the quietude that usually prevails at this season of the year. Nothing has occurred to stimulate export operations, apart from reports of a contemplated increase in the duty on Cotton-Seed Oils by the French Government, and even that factor has led to no really important purchases. Taken as a whole, supplies of the leading Oils are in fairly good position statistically, and in the few instances where this does not prove to be the case, prices are down to a level with which buyers have no good cause to find fault.

Linseed Oil.—The distribution at present is on a moderate scale and the demand slow, but both city crushers and sellers of out of town brands adhere to former prices for spot goods. Regarding orders for next year's delivery, reports are somewhat conflicting. As a rule manufacturers are indifferent about taking orders in view of the comparatively high prices for raw material for spring shipment, but some firms, it is estimated, are on the lookout for orders for product to be made during the winter, which may be delivered later on.

Cotton-Seed Oils.—Crude has been selling in a limited way only, but, with receipts moderate, prices remain quite firm. Several parcels of prime went at 25¢ @ 25½¢, and one at as high as 26¢. Of refined, upward of 3000 barrels new and 1500 barrels old have been placed, over one half of which was taken for export. Prices have ruled practically the same as last week, prime quality selling at 30¢ and "off" grade at 28¢ @ 29½¢, as to color. Thus far this season over 3,000,000 gallons have been exported, against about 1,500,000 gallons during the corresponding period last year.

Fish Oils.—No change has taken place in the market for crude Sperm or Whale Oils, and manufacturers' prices for the refined products remain as before, but with a tendency toward a higher range. Crude Menhaden is being closely marked up, as it comes forward on contracts, and, as the supply seems likely to be exhausted before the end of the season, manufacturers are gradually advancing their prices for the Pressed and Bleached Oils, the most of which are now held at about 1¢ over the figures that ruled last week. Cod Oil is in very limited supply, and 40¢ seems now to be inside price.

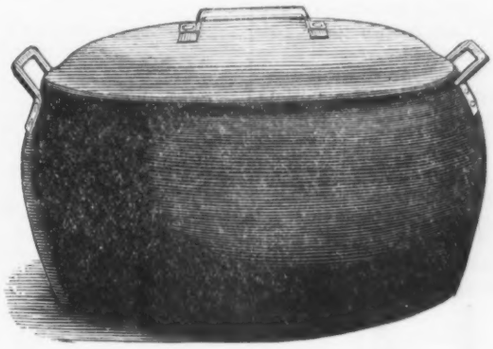
Lard and Tallow Oils.—For Lard Oil there has been merely a routine sort of demand, but prices are held very steady in the absence of any pressure of stock for sale by local pressers or heavy offering of out of town brands. Tallow Oil is firmer, in sympathy with higher cost of raw material, but no positive advance in prices has been established.

Miscellaneous.—Purchases of Olive Oil in barrels are still on a rather small scale and the demand continues slow, but prices have undergone no changes. Ceylon Cocoanut Oil has been selling from dock at 5⅛¢ @ 5¼¢. The bulk of late arrivals are disposed of and the market shows somewhat better tone.

Spirits Turpentine.—Present low prices have prompted somewhat freer purchases on the part of large consumers and the market shows better tone, without, however, any radical change in prices. Business has been chiefly at 33½¢ for regular and 34¢ @ 34½¢ for machine barrels.

Oblong Boiler.

The Stuart & Peterson Company, Philadelphia, Pa., are offering this style of boiler, as illustrated herewith. It is cast iron, either tinned or enameled, with side handles. The boiler is furnished with bail instead of side handles when so ordered. It is designed for the use of chemists, hotels and large institutions and is made in 8, 10, 12 and 16 gallon sizes.



Oblong Boiler.

Bicycle Step Ladder.

The Bicycle Step Ladder Company, Davenport, Iowa, are offering this article, as illustrated in Fig. 1. In mounting the ladder the wheels are located near the lower end, and run upon a track placed either at the edge of the base shelf, or in case of no base shelf, upon the floor. At the top of the ladder is a handsomely finished hardwood pole, mounted on light ornamental metal brackets, against which the top of the ladder rests. This also serves as a smooth, continuous guide, along which the top of the ladder slides in passing along the shelving. To prevent the ladder from swinging out from the top it is provided with two stout hooks, which hook over the pole in such a way as not to carry any of the weight of the ladder, which weight all rests on the wheels and track. The point is made that by this arrangement the empty ladder is nearly in a perfect balance upon the wheels, and that the friction is reduced to a minimum. It is stated that if the operator, when standing on the ladder, wishes to move it, a very slight adjustment of the position of his body will balance the weight perfectly on the wheels, no matter which step he may be standing on, as shown in Fig. 2. Thus in riding from place to place it is stated that there is only the slight friction at the wheels to be overcome, which may be greatly reduced by the use of anti-friction rollers. The ease with which the ladder moves is referred to as being so great that either empty or with the operator on it may be propelled 50 or 60 feet by one push. The ladder is supplied with various conveniences, such as a broad large shelf at the top, useful in arranging stock, &c.; a brake or lock for holding the ladder firmly in position when desired, and various other conveniences peculiar to the business for which it is built. The advantages claimed for the ladder are that it is possible to move it quickly without danger of throwing the wheels from the track; that there is no strain upon the shelving and great safety to the operator; that control is had of the ladder in all positions, and the light and ornamental material used in its construction. We are informed that though the ladder has been upon the market but a short time it has found its way into some of the leading hardware establishments of the Western cities.

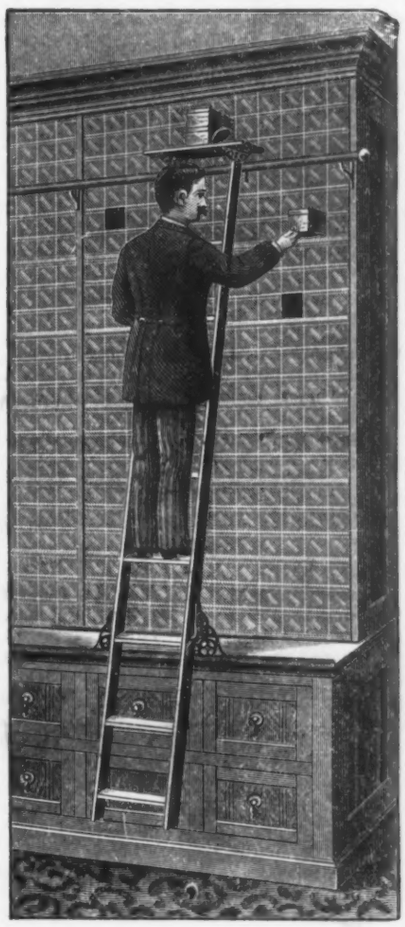


Fig. 1.—Bicycle Step Ladder.

Fig. 2.—Showing the Manner in which the Ladder is Balanced.

Peerless Garden Hose Nozzle.

H. A. Williams Mfg. Company, 332-336 Congress street, Boston, and 55 Fulton street, New York, are offering the Peerless Nozzle, as illustrated in Figs. 1 and 2. The nozzle has a solid felt packing which, it is stated, will stand 100 pounds pressure without leaking. This arrangement is considered by the manufacturers better than plug cocks, cams,

Fig. 1.—Peerless Garden Hose Nozzle.

Fig. 2.—Peerless, Throwing a Solid Stream.

rubber or leather valves. The nozzle will throw a fine or coarse spray and a solid stream, or the water may be entirely shut off by turning the sleeve or outside of the nozzle around the center. It is claimed that the force of the water will not affect the position of the nozzle as set, either spray or solid stream.

The Handy Folding Bench.

Diether & Barrows, Fort Wayne, Ind., are introducing this article, as shown in Figs. 1 and 2. It is referred to as being made of hard wood, nicely stained, and as presenting a neat and attractive appearance. The manufacturers claim that it is as cheap as a common one; that it folds when not in use, occupying little room, and that it is light, yet strong and durable. It is designed for use in stores for displaying all kinds of wares, and for setting tubs, baskets, boxes, &c., on. It can also be used as a flower stand.

Fig. 1.—The Handy Folding Bench.

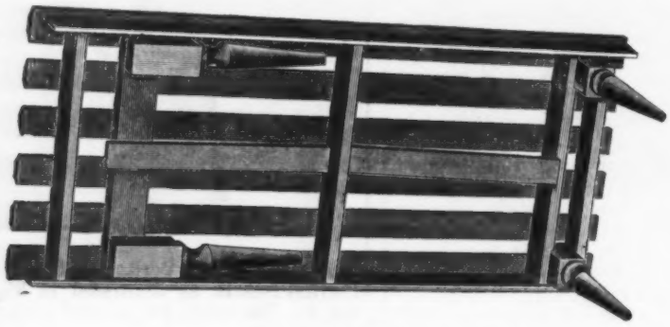
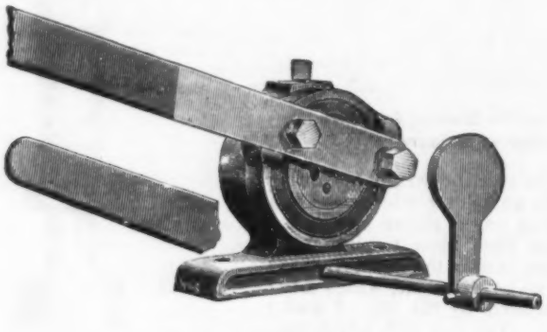


Fig. 2.—The Bench as Folded.

Scranton's Improved Rod Cutter.

Belden Machine Company, New Haven, Conn., are offering this article, as illustrated herewith. It is referred to as being simple in construction, made of the best material and easily and quickly adjusted. Special attention is called to the facts that the piece of wire or rod to be cut is entirely exposed to view, so that accurate measurement can be taken if desired, and that the piece when cut drops entirely from the tool. The cutter strikes the wire or rod just off from the pivot or center, so that great leverage is obtained, and should the cutters get dull, as they will do on any tool for this purpose, they can be easily sharpened and replaced in the original position. The tool is designed for use by any one who has wire or rods to cut to a desired length at short notice, without a power machine. The cutters are made in two sizes, one cutting rods $\frac{5}{16}$ inch and under and the other $\frac{1}{2}$ and under. The manufacturers state that the tools are neat in appearance, and are shipped securely packed complete with gauge and rod with each tool.

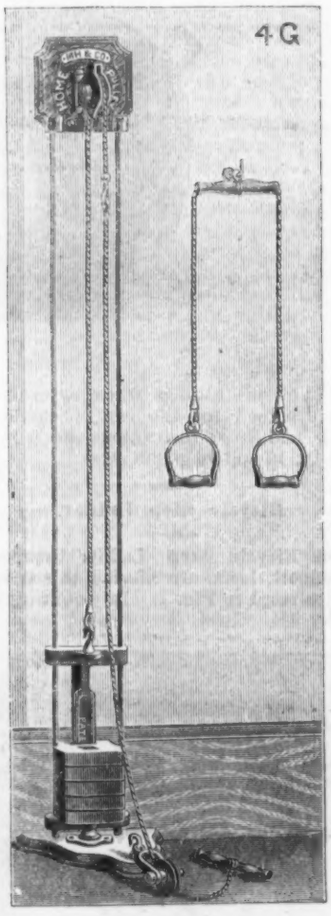


Scranton's Improved Rod Cutter.

The utter worthlessness of poor locks is so generally admitted that it is evident that nothing but personal inspection can insure the application of good articles. Unfortunately it often happens that the owner is so unfamiliar with lock construction that he is unable to tell anything about the merits of the various kinds by examination of the mechanism. The only remedy in such a case is to deal where the inferior articles are not handled under any circumstances, and where a willingness to exhibit the interior mechanism of the locks is accompanied by an evident desire to give an intelligent explanation of their construction and operation.—*Trefoil.*

Single-Weight Home Pulley.

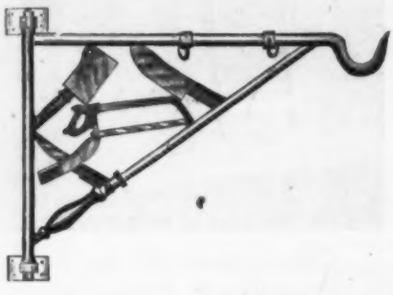
Merwin, Hulbert & Co., 26 West Twenty-third street, New York, are offering the chest weight as illustrated herewith. It has but one weight stand, and is provided with their interchangeable floor attachment, swivel and loose lubricating noiseless pulley, and requires but 5 x 4 inches floor space. This machine is furnished in enamel or nickel, and is designed for home use, where a medium-priced machine is desired.



Single-Weight Home Pulley.

Gloekler's Pittsburgh Out-Door Bracket.

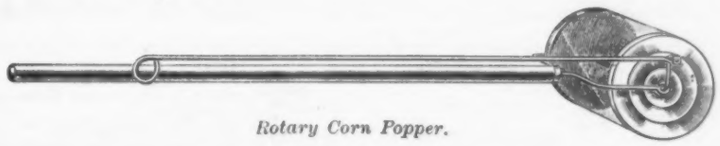
Bernard Gloekler, Pittsburgh, Pa., is introducing a bracket for butchers' use, as illustrated herewith. This is of recent design and shows an arrangement of tools peculiar to the business. It is heavily tinned and extends 25 inches from the sockets. It can be placed in any desired position, being fastened in place by sockets.



Gloekler's Pittsburgh Out-Door Bracket.

Rotary Corn Popper.

Hamblin & Russell Mfg. Company, Worcester, Mass., with offices at New York, Philadelphia, Boston and Chicago, are offering this article, as illustrated herewith



Rotary Corn Popper.

It is operated by holding the handle in one hand and rotating the cylinder by the aid of the wire rod. The point is made that it keeps the kernels in constant motion, which prevents the corn burning, and that it can be worked equally well over a grate, stove or furnace. The popper is referred to as being much more easily manipulated than the ordinary shaker, and as proving serviceable for the fireside.

New Sash Balance.

J. E. Moore, Danville, Pa., is offering an adjustable sash balance, as illustrated in Fig. 1. It consists of a metallic cylinder, 1¼ inches in diameter, inclosing a double spiral spring, and having two metallic tapes which run over pulleys at each end, as shown in Fig. 2. The spiral spring is adjustable at the ratchet E, Fig. 1, to counterbalance the weight of sash weighing from 6 to 16 pounds each, and

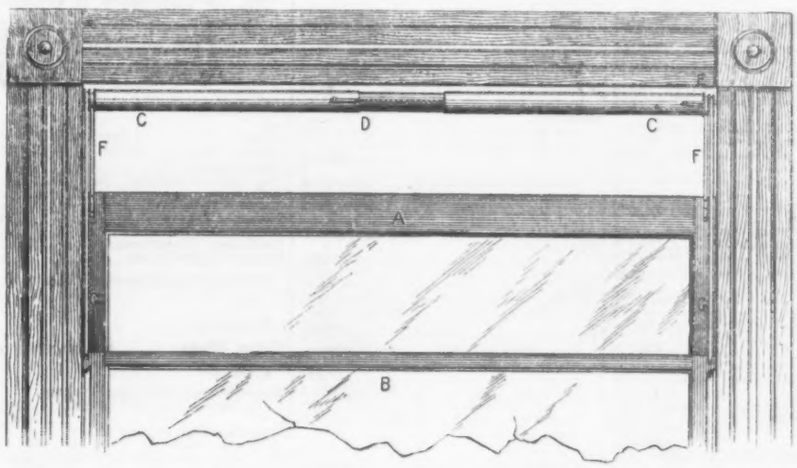


Fig. 1.—The J. E. Moore Sash Balance.

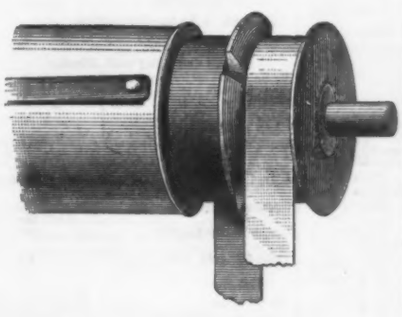


Fig. 2.—End View of Sash Balance.

40 inches or under in length. The balance is also adjustable for windows from 27½ inches to 35½ inches wide, by sliding the cylinder apart from the center. The upper sash is connected to the balance by the brass ribbons F F, and the lower sash by the ribbons G G. The point is made that the balance may be entirely hid by the window curtain; that the ribbons attached to the lower sash are concealed from view by the sash strip, and that the upper sash ribbons are only seen when the sash is lowered The balance is made in the size above described, and special sizes may be made to order. The manufacturer states that the balance is well and durably made and that none of the parts are liable to give out except perhaps the ribbons, and that they can be replaced much cheaper than sash cord.

Ready Change Holder.

Penn Novelty Company, 14 North Seventh street, Philadelphia, Pa., are putting this article on the market, as illustrated herewith. The cut represents the article full size for holding coins, by which quarters, dimes, nickels and pennies are kept in their separate compartments. It weighs 1½ ounces, is well finished and heavily nickel plated. It is adapted for ladies and school children equally as well as for business men, employees or any persons constantly using small change. The

Ready Change Holder.

point is made that the coins may be drawn out by the thumb instantaneously as required without danger of dropping them.

The Lee Vacuum Engine Company, capitalized at $100,000, have been incorporated at New Orleans, La., to manufacture steam engines.

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CURRENT HARDWARE PRICES.

DECEMBER 16, 1891.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' Prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.
Domestic.....₩ doz $3.00, 33⅓%
Excelsior.....₩ doz $10.00.....50&10&2%
North's .....list net @10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils.—
Eagle Anvils, ₩ ℔ 10¢.....15@15&5%
Peter Wright's.....11@11½¢
Armitage's Mouse Hole.....10½@11¢
Armitage's Mouse Hole, Extra...12@12½¢
Trenton.....10@10½¢
Wilkinson's.....10½@11¢
Moore & Barnes Mfg. Co.....33⅓%

Anvil Vise and Drill—
Millers Falls Co., $18.00.....20%
Cheney Anvil and Vise.....35%
Allen Anvil and Vise, $3.00.....40&10%
Star.....45&5%

Apple Parers—See Parers, Apple, &c.

Augers and Bits—
Douglass Mfg. Co.
Wm. A. Ives & Co.
Humphreysville Mfg. Co.
French, Swift & Co. (F. H. Beecher, P. S. & W. Co
Rockford Bit Company
} 70&10&10 70 &10&5%
Cook's, Douglass Mfg. Co.....55%
Cook's, N. H. Copper Co.50&10&50&10&5%
Ives' Circular Lip 60%
Patent Solid Head.....30%
C. E. Jenning & Co., No. 10, extension lip 40%
C. E. Jennings & Co., No. 30.....60%
C. E. Jennings & Co., Auger Bits, ₩ set, 33⅓% quarters, No. 5, $5; No. 30, $3.50.20%
Lewis' Patent Single Twist.....45%
Russell Jennings' Augers and Bits.25&10%
Imitation Jennings' Bits.....60@60&10%
Pugh's Black.....20%
Car Bits.....60@60&10%
Car Bits, P. S. & W. Co.....60&10%
Snell's Car Bits.....60%
L. Hommodieu Car Bits.....15&10%
Forstner Pat. Auger Bits.....20%
Cincinnati Bell-Hangers' Bits....50&10%

Bit Stock Drills—
Morse Twist Drills .....50&10&5%
Standard.....50&10&5%
Cleveland.....50&10&5%
Syracuse, for metal.....50&10%
Syracuse, for wood (wood list).30@30&5%
Cincinnati, for wood.....30&10%
Cincinnati, for metal.....45&10%

Expansive Bits—
Clarks' small, $18; large, $26..35@35&10%
Ives' No. 4, ₩ doz $60.....40%
Swan's 40%
Steer's, No. 1, $26; No. 2, $22.....35%
Stearns' No. 2, $48.....20%

Gimlet Bits—
Common .....₩ gross $2.75@$3.25
Diamond .....₩ doz $1.10.....25&10%
Bee.....25@25&5%
Double Cut, Shearman's.....45@40&10%
Double Cut, Ct. Valley Mfg. Co ...30&10%
Double Cut, Hartwell's, ₩ gro.....$5.25
Double Cut, Douglass' .....40&10%
Double Cut, Ives' .....60@60&10%

Hollow Augers—
Ives .....
French, Swift & Co.....
Douglass'
} 33⅓ @ 33⅓&10%
Bonney's Adjustable, ₩ doz $48.....40&10%
Stearns' .....20&10%
Ives' Expansive, each $4.50.....50&5%
Universal Expansive, each $4.50.....20%
Wood's .....25@25&10%
Cincinnati Adjustable.....25&10%
Cincinnati Standard.....25&10%

Ship Augers and Bits—
L'Hommedieu's.....15&10@15&10&5%
Watrous'.....15&10@15&10&10%
Snell's .....15&10@15&10&5%
Snell's Ship Auger Patt'n Car Bits, 15&10@15&10@5%

Awl Hafts—See Hafts, Awl.

Awls—
Awls, Sewing, Common .₩ gr $1.70, 45%
Awls, Should. Peg, ₩ gr $2.45, 50@50&10%
Awls, Pat. Peg...₩ gr 63¢.... 50@50&10%
Awls, Shouldered Brad..2.70 ₩ gr.....35%
Awls, Handled Brad...$7.50 ₩ gr.....45%
Awls, Handled Scratch ₩ gr, $7.50.35&10%
Awls, Socket Scratch, ₩ doz, $1.50.25@30%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

	Plain.	Beveled.
First quality, best brands	$7.00 @	$7.50
First qual., other brands	6.62½ @ 6.75	
Second quality	6.00	6.50

Axle Grease—See Grease, Axle.

Axles—
No. 1.4½@5¢, No. 2 5½@6¼¢
Nos. 7 to 14.....55&5%
Nos. 16 to 18.....47½%
Nos. 19 to 22.....70%
} 3% cash
Concord Axles, loose collar.....5½@6¢
Concord Axles, solid collar.....6¢@7¢
National Tubular Self-Oiling.....33⅓%@33⅓&5%

Bag Holders.—See Holders, Bag.

Balances—
Spring Balances.....40%

	No. 2000	20	30
Chatillon, ₩ doz	$0.80	0.95	1.75 net

Chatillon Straight Balances.....40%
Chatillon Circular Balances.....50&10%

Barb Wire.—See Wire, Barb.

Bars.
Crow—
Cast Steel.....₩ ℔ 3½¢
Iron, Steel Points.....₩ ℔ 3¢

Basins, Wash—
Standard Fiberware, No. 1, 10½-inch, $2; 12-inch, $2.25; 13½-inch, $2.75; 15-inch, $3.25.

Beams, Scale—
Scale Beams, List Jan. 12, '82...50&10@ 50&10&5%
Chatillon's No. 1.....40%
Chatillon's No. 2.....50%
Custer's.....33⅓%

Beaters—
Egg—
Dover.....₩ doz $1.50
Duplex (Standard Co.).....₩ doz $1.25
Rival (Standard Co.).....₩ doz $1.00
Duplex Extra Heavy (Standard Co.)..... ₩ doz $3.50
Bryant's.....₩ gro $14.00
Double (H. & R. Mfg. Co.), ₩ gro. No. 0, $12.00; No. 1, $15.00; No. 2.....$36.00
Kasy (H. & R. Mfg. Co.).....₩ gro $12.00
Triple (H. & R. Mfg. Co.).....₩ gro $16.50
Spiral .....₩ gro $4.25 @ 4.50
Improved Acme (H. & R. Mfg. Co.)..... ₩ gro $9.00
Paine, Diehl & Co.'s.....₩ gro $24.00
Silver & Co.....₩ doz $5.50
Culinary—
Keystone, P.D.&C., Each, No. 1, $1; No. 2, $2.....20%

Bells—
Cow—
Common Wrought.....60&10%
Western, Sargent's list.....70&10%
Kentucky, "Star".....20&10%
Kentucky, Sargent's list.....70&10%
Kentucky Durham.....70&10
Dodge, Genuine Kentucky....70@70&10%
Texas Star.....50&10&50&10&5%
Door—
Gong, Abbe's .....33⅓&10%
Gong, Yankee.....45&10%
Gong, Barton's.....40&10@50%
Crank, Taylor's.....25&10%
Crank Brooks'.....50&10&2%
Crank Cone's.....10%
Crank, Connel's.....20&10%
Lever, Sargent's.....60&10%
Lever, Taylor's Bronzed or Plated....net
Lever, Taylor's Japanned .....25&10%
Lever, R. E. M. Co.'s.....50&10&2%
Pull, Brook's.....50&10&2%
Electric,
Wollensak's.....20%
Bigelow & Dowse.....20%
Taylor's 20%
Hand—
Light Brass.....70&10%
Extra Heavy.....70
White Metal.....70%
Silver Chime.....33⅓&10%
Globe Conc'n Patent) .....25&10&35%
Miscellaneous—
Call.....40@40&5%
Farm Bells.....₩ ℔ 3¢@3½¢
Steel Alloy Church and School Bells..40%

Bellows—
Blacksmiths' .....60&5@65%
Molders' .....40@40&10%
Hand Bellows.....40&10@50%

Belting, Rubber—
Common Standard.....70@70&10&5%
Standard.....70@70&5%
Extra.....60@60&10%
N.Y.B.&P.Co., Carbon.....60%
N.Y.B.&P.Co., Diamond.....50%
N.Y B.&P.Co., Para.....40%

Bench Stops—See Stops, Bench.

Benders and Upsetters, Tire.
Stoddard's Lightning Tire Upsetters..15%
Detroit Perfected Tire Bender.....15%

Bits—
Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—
Ordinary Tackle, list May 20, 1889... 70&10@—%
Cleveland Block Co., Mal. Iron.....50%
Moore's Novelty, Mal. Iron.....50%
Sure Grip Steel Tackle Blocks.....25%

Boards, Stove.
Wood Lined Crystal.....50%
Oxidized.....45%
Embossed 50%
Paper Lined Zinc.....55%
Crystal.....55%
Embossed.....55%
New Tacoma.....55%

Bolts—
Carriage, Machine, &c.—
Com. list June 10, '84 ....70&10&12½&2%
Genuine Eagle, Norway, list Oct., '84... 80 &80&10%
Phila. pattern, list Oct. 7, '84..75@75&10%
R.B.&W., old list 70%
Machine, list Jan. 1, 1890..... 75&10@75&10&5%
Bolt Ends, list Jan. 1, 1890..... 75&10@75&10&5%
Door and Shutter—
Cast Iron Barrel, Square, &c..70@70&10%
Cast Iron Shutter Bolts.....70@70&10%
Cast Iron Chain (Sargent's list).65&10%
Ives' Patent Door Bolts 60&10@60&10&5%
Wrought Barrel.....70@70&10%
Wrought Square.....70@70&10%
Wr't Shutter, all Iron, Stanley's..60&10%
Wr't Shutter, Brass Knob, " .....40&10%
Wr't Shutter, Sargent's list.....60&10%
Wr't Sunk Flush, Sargent's list....55&10%
Wr't Sunk Flush, Stanley's list....50&10%
Wr't B.K.Flush. Com'n " ....55&10%

Stove and Plow—
Stove.....60%
Plow.....60&5%
R. B. & W., Plow.....55%
Tire—
Common, list Feb. 28, '83.....65%
Port Chester Bolt and Nut Company:
Empire. list Feb 28, '83.....65%
Keystone, Philadel., list Oct, '84....80%
Norway, Phila., list Oct. '84 .....75%
American Screw Company:
Norway, Phil., list Oct. 16, '84.....75%
Eagle, Phil., list Oct. 16, '84.....80%
Philadel., list Oct. 16, '84.....80%
Bay State, list Feb. 28, '83.....65%
R.B.&W., Philadel., list Oct. 16, '84....80%

Borers, Tap.
Common and Ring.....20&10%
Ive's Tap Borers.....33⅓&5%
Enterprise Mfg. Co.....20&10&30%
Clark's.....33⅓&35%

Borax.....₩ ℔ 9½@10½¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon.
Per ℔.....2¾¢

Braces.—
American Bit Brace Co.:
Nos. 10, 12, 20.....60&10%
Nos. 11, 21, 24, 27.....70&10%
Nos. 22, 23, 25.....60&10&5%
Nos. 13, 26, 36, 37.....70&10&5%
Ball Braces, net .....$1.12 to $1.25
Amidon's
Barker's Imp'd Plain.....75&10@80%
Barker's Imp. Nickeled....65&10@70%
Ratchet.....75&10@80%
Eclipse Rachet.....60%
Globe Jawed.....40@40&10%
Corner Brace.....40@40&10%
Universal, 8 in., $2.10; 10 in.....$2.35
Buffalo Ball.....$1.10@$1.1
Barber's,
Nos. 10 to 16.....50%
Nos. 30 to 33.....50%
Nos. 40 to 63.....50&10%
Saxton's,
Barker's Imp. Polished.....75&10@80%
Barker's Imp. Nickeled....65&10@70%
Ratchet, Polished.....50&10@60%
Ratchet, Nickeled.....40&10@50%
Buffalo Ball.....net, $1.10@$1.15
Bartholomew's,
Nos. 25, 27 and 30.....50&10@60&5%
Nos. 117, 118, 119.....70@70&5%
Common Ball, American.....$1.00@$1.10
Fray's Genuine Spofford's..50&5@50&10%
Fray's No. 70 to 120, 81 to 123, 207 to 414 50&10%
Ives' New Haven Novelty.....70@70&5%
New Haven Ratchet.....60&5@60&10%
Barber Ratchet.....60&5@60&10%
Barbers.....60&5%
Spofford.....60&5@60&10%
Osgood's Ratchet.....40&10@50%
P. S. & W. Co., Peck's Patent.....60%

Brackets—
Shelf, plain,
Regular list.....65@70%
Sargent & Co.'s list.....66⅔@66⅔&10%
Shelf, fancy,
Sargent & Co.'s list.....66⅔@66⅔&10%
Other makes at a wide range of prices.

Bright Wire Goods—See Wire.

Broilers—
Henis' Self-Basting. } Inch..... 9 10 9x11
Per doz ..$4.50 5.50 6.50
New Haven..... 50%
Wire Goods Co ..... 65&10%
Morgan Odorless.....₩ doz $12, 33⅓%

Buckets, Well.
Galvanized—
Hill's.....₩ doz, 12 qt, $4.25; 14 qt, $5.25
Iron Clad.....₩ doz. 14 qt, $4.25@$4.50
Helwig's Flat Iron Band.....$3.75
Helwig's Wired Top.....₩ doz $4.00

Bull Rings—See Rings, Bull.

Butchers' Cleavers—See Cleavers Butchers'.

Butts—
Brass—
Wrought Brass.....75&10@80
Cast Brass, Tiebout's'.....50
Cast Brass, Fast.....33⅓&10%
Cast Brass, Loose Joint.....33⅓&10
Cast Iron—
Fast Joint, Narrow.....50&10&5@60
Fast Joint, Broad.....50&10@60
Loose Joint.....
Loose Joint, Japanned.....
Loose Joint, Jap. with Acorns..
Parliament Butts.....
Mayer's Hinges .....
Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned...
Loose Pin, Acorns, Japanned, Plated Tips.....
} .70&10@75
Wrought Steel—
Fast Joint, Narrow.....
Fast Joint, Lt. Narrow.....
Fast Joint, Broad .....
Loose Joint, Broad.....
Table Butts, Back Flaps, &c ....
Inside Blind, Regular.....
Inside Blind, Light.....
Loose Pin.....
} .70&10@75
Bronzed Wrought Butts.....50%

Calipers—See Compasses.

Calks, Toe—
Gautier, One Prong, Blunt.....5½@6¢
Burke's, One Prong, Blunt.....5½@6¢
Burke's, Two Prong, Blunt.....7½@8¢
Burke's, One Prong, Sharp.....6½@7¢

Can Openers—See Openers, Can.

Caps—
Percussion, ₩ 1000—
Dicks & Goldmark's and Union Metallic Cartridge Co.
F. L. Waterproof, 1-10's.....35@37½
E. B. Trimmed Edge, 1-10's.....47@50¢
E. B. Grnd. Edge, Cent. Fire, 1-10's.... 47@50¢
Musket Waterproof, 1-10's.....50@53¢
G. D.....27@30¢
A. B. Genuine Imported.....45¢
Eley's E. B.....56¢ @ 58¢
Eley's D Waterproof, Central Fire...$1.60
Primers—
Berdan Primers, $1.00.....2%
U. L. Caps (for Sturtevant Shells) $1.00, 2%
All other Primers, $1.20.....2%

Cards—List January 28, 1891.
Watson's Cotton, Wool, Horse and File.....25%

Carpet Stretchers—See Stretchers Carpet.

Carpet Sweepers—See Sweepers, Carpet.

Cartridges—
Rim Fire Cartridges.....50&5&2 %
Rim Fire Military.....15&2 %
Cent. Fire, Pistol and Rifle.....25&5&2 %
Cent. Fire, Military and Sporting 15&5&2 %
Blank Cartridges, except 22 and 32 cal., additional 10 % on above discounts.
Blank Cartridges, 22 cal., $1.75.....2 %
Blank Cartridges, 32 cal., $3.50.....2 %
Primed Shells and Bullets.....15&5&2 %
U. S. Caps, Round Ball, $1.75.....3 %
U. S. Caps, Con. Ball, Swgd., $2.00.....2%

Casters—
Bed.....
Plate.....
Shallow Socket.....
} Brass....55@55&10%
Others...50@60&10%
Deep Socket.....40&10%
Yale Casters, list May, 1884...30&10@40%
Yale, Gem.....60@60&5%
Martin's Patent (Phœnix).....45&10@50%
Payson's Anti-friction.....70%
Giant Truck Casters.....30%
Stationary Truck Casters.....50&10%
Socket Truck Casters.....50%

Cattle Leaders—See Leaders, Cattle.

Cement.
Victor Elastic.....5 ℔ pails ₩ ℔ 5¢

Chain—
Trace, Wagon and Fancy Chains, List revised April 21, 1890.....60@ 60&10
American Coil, in cask lots,

3-16	¼	5-16	⅜	7-16	½	⅝	¾
$7.75	5.45	4.55	4.00	3.65	3.50	3.40	3.30

Less than cask lots, add ¼¢@½¢ ℔.
German Coil, list Oct 6, 1890...60@60&5%
German Halter Chain, list Oct 6, 1890 60@60&5%
Covert Halter.....60&2½
Covert Traces.....35&2½
Covert Heel Chain.....50&2½
Oneida Halter Chain.....60@60&2½
Galvanized Pump Chain.....₩ ℔ 5½@6¢
Jack Chain, Iron.....75&10@80%
Jack Chain, Brass.....75@75&10%

Chalk—
White, case lots, ₩ gr 50¢; small lots 55 @55¢
Red, case lots...₩ gr 67¢; small lots 77 @78¢
Blue, case lots.. ₩ gr 75¢; small lots 85¢
See also Crayons.

Chalk Lines—See Lines.

Chisels—
Socket Framing and Firmer.
P. S. & W.....
New Haven.....
Witherby.....
Mix.....
Ohio Tool Co.....
} ..75 @ 75&10 %
Douglass.....75@75&5%
Buck Bros.....
Merrill.....60&10@60&10&5%
L. & L. J. White.....50@50&5%
Tanged and Miscellaneous.
Tanged Firmers.....40&10@50%
Butchers'.....$4.75@$5.00
Spear & Jackson's.....$5 to £
Buck Bros.....30%
Cold Chisels, ₩ ℔ .....15@10%

Chucks—
Beach Pat.....each, $8.00.....20%
Morse's Adjustable, each, $7.00, 20@20&5%
Danbury.....each, $6.00, 30@30&5%
Syracuse, Bals Pat.....25%
Graham Patent.....33⅓%
Skinner's Patent Chucks.
Combination Lathe Chucks.....33⅓%
Universal Lathe Chucks 40%
Independent Lathe Chucks.....40%
Drill Chucks.....15%
Union Mfg. Co.,
Victor.....$3.50, 25%
Combination.....40%
Universal.....40%
Independent.....40%

Churns.
Tiffin Union, each, 5 gal. $3.25; 7 gal. $3.75; 10 gal..$4.25.
McDermaid Star Barrel Churn, each, 6 gal., $2.60; 10 gal., $2.75; 15 gal. $3.00 20 gal., $3.25.

Clamps—

B. I. Tool Co.'s Wrought Iron.....25%
Adjustable, Cincinnati.....15&10%
Adjustable, Hammers.....15%
Adjustable, Stearn's.....30@30&10%
Stearn's Adjustable Cabinet and Corner.....30@30&10%
Cabinet, Sargent's.....60%&10%
Carriage Makers', Sargent's.....70&10%
Carriage Makers', P., S. & W. Co..40&10%
Eberhard Mfg. Co.....40&5@40&10%
Warner's.....40&10@40&10&5%
Saw Clamps, see Vises, Saw Filers'.
Carpenters', Cincinnati.....25&10%

Cleavers.

Butchers'.

Bradley's.....25@30%
L. & I. J. White.....20&5%
Beatty's.....40@40&5%
New Haven Edge Tool Co.'s.....40%
P., S. & W.....33⅓&5@33⅓&10%
Foster Bros.....30%
Schulte, Lohoff & Co.....40@40&5%

Clips—

Norway, Axle, ¼ & 5-16.....55&5&5%
2nd grade Norway Axle, ¼ & 5-16 65&5%
Superior Axle Clips.....66⅔&5@70%
Norway Spring Bar Clips, 5-16..60&5&5%
Wrought-Iron Felloe Clips.....₩ lb, 5½¢
Steel Felloe Clips.....₩ lb, 6¢
Baker Axle Clips.....25%

Cloth and Netting, Wire—See Wire, &c.

Cockeyes.....50%

Cocks, Brass.

Hardware list.....50&2%

Coffee Mills—See Mills, Coffee

Collars, Dog, &c.

Medford Fancy Goods Co.....40&10%
Embossed, Gilt, Pope & Steven's list 30&10%
Leather, Pope & Steven's list.....40%
Brass, Pope & Steven's list.....40%
Chapman Mfg. Company.....50&10@60%

Combs, Curry.

Fitch's.....50&10@50&10&10%
Rubber, per doz $10.00 20%
American Curry Comb Co..New prices in preparation.

Compasses, Dividers, &c.—

Compasses, Calipers, Dividers.70@70&10%
Bemis & Call Co.'s
Dividers.....60&5%
Compasses & Calipers.....50&5%
Wing and Inside or Outside.....50&5%
Double.....50%
(Call's Pat. Inside).....30%
Excelsior.....50%
J. Stevens & Co.'s.....25&10%
Starrett's
Spring Calipers and Dividers....25&10%
Lock Calipers and Dividers.....25%
Combination Dividers.....25%

Coopers' Tools—See Tools, Coopers'.

Cord—

Sash.

Common.....₩ lb, 10¢ @ 11¢
Patent, good quality.....₩ lb, 12 @ 12½
White Cotton Braided, fair, ₩ lb, 24½@25¢
Common Russia Sash.....₩ lb, 12½@13¢
Patent Russia Sash.....₩ lb, 14¢
Cable Laid Italian Sash.....₩ lb. 21@22¢
India Cable Laid Sash.....₩ lb, 12¢
Silver Lace—
A Quality, White, 50¢.....25 %
A Quality, Drab, 55¢.....25 %
B Quality, White, 30¢.....10 %
B Quality, Drab, 35¢.....10 %
Sylvan Spring Extra Braided White, 34¢
Sylvan Spring, Extra Braided, Drab..39¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....26¢
Massachusetts, White.....30¢
Samson—
Braided, White Cotton, 50¢..30@30&5%
Braided, Drab Cotton, 55¢...30@30&5%
Braided, Italian Hemp, 55¢..30@30&5%
Braided, Linen, 80¢.....30@30&5%
Tate's Cotton Braided, White, ₩ lb, 28¢.10%

Wire Picture.

Braided or Twisted.....75&10%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters—See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.).....40%
Blake's Pattern.....₩ doz $2.00, 10%
Turner & Seymour Mfg. Co.....50%

Cradles—

Grain.....50&5&2@50&10&2%

Crayons.

White Crayons, ₩ gross.....10¢
D. M. Stewart Mfg. Co., Metal Workers, ₩ gr, $2.50.....25%
D. M. Stewart Mfg. Co., Rolling Mill, ₩ gr, $2.50.....25%
See also Chalk.

Crow Bars—See Bars, Crow.

Curry Combs—See Combs, Curry.

Curtain Pins—See Pins Curtain.

Cutters—

Meat.

Dixon's ₩ doz.....40&5%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$50.00

Woodruff's ₩ doz.....40&5%

Nos.	100	150
	$15.00	$18.00

Hales Pattern ₩ doz.....70@70&5%

Nos.	13	12	13
	$27.00	$33.00	$45.00

American.....50%

Nos.	1	2	3	4	5	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....30%

Nos.	10	12	22	32	42
Each	$3	$2.50	$4	$6	$15

Great American Meat Cutter.....30%

Nos.	112	116	118	120	122
Each	$2.00	$2.75	$3.00	$2.50	$4.00

Miles' Challenge ₩ doz.....45@45&10%

Nos.	1	2	3
	$22.00	$30.00	$40.00

Home No. ₩ doz $26.00, 55&10%

Draw Cut, each:

Nos.	5	2	6	8
	$50	$75	$80	$225

Beef Shavers (Enterprise).....20&10@30%
Little Giant (P. S. & W. Co.).....50%
Chadborn's Smoked Beef Cutter, ₩ doz $66.00

Tobacco.

Champion.....20&10@30%
Wood Bottom.....₩ doz $5.00@$5.25
All Iron.....₩ doz $4.25
Nashua Lock Co.'s..₩ doz, $18.00 50@55%
Wilson's.....55%
Sargents'.....₩ doz, $24, 55&10%
Acme.....₩ doz $20.00, 40%

Washer.

Smith's Pat.....₩ doz $12.00, 20&10&10%
Johnson's.....₩ doz $11.00, 33⅓%
Penny's, ₩ doz Pol. $14; Jap'd, $16.00, 55%
Appleton's.....₩ doz $16.00, 60&10%
Bonney's.....30&10%
Cincinnati.....25&10%

Dampers, &c—

Dampers, Buffalo.....40&10%
Buffalo Damper Clips.....40&10%
Crown Damper.....40%
Excelsior.....40&10%

Diggers, Post Hole, &c.—

Samson Post Hole Digger, ₩ doz $36.00, 25%
Fletcher Post Hole Augers, ₩ doz $36, 20%
Eureka Diggers.....₩ doz $12.50@14.00
Leed's.....₩ doz $8.00@9.00
Vaughan's Post Hole Auger, ₩ doz $13.00@14.00
Kohler's Little Giant.....₩ doz. $18.00
Kohler's Hercules.....₩ doz. $15.00
Kohler' New Champion.....₩ doz. $9.00
Schniedler.....₩ doz. $18.00
Ryan's Post Hole Diggers..₩ doz $24.00
Cronk's Post Bars, ₩ doz $60.00, 50&5@50&10%
Gibbs Post Hole Digger, ₩ doz $30.00, 50¢
Imperial, ₩ doz $15.....45%

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, ₩ doz.....$18&$20

Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'.....each $1.75
Blacksmiths' Self-Feeding, each $7.50,20%
Breast, P. S. & W.....40&10%
Breast, Wilson's.....30&5%
Breast, Millers Falls.....each $3.00, 25%
Breast, Bartholomew's....each $2.50, 25&10@40%
Ratchet, Merrill's.....20@20&5%
Ratchet, Ingersoll's.....25%
Ratchet, Parker's.....20@20&5
Ratchet, Whitney's.....20&10%
Retchet, Weston's.....20@25%
Ratchet, Moore's Triple Action..35@30%
Ratchet, Curtis & Curtis.....30%
Whitney's Hand Drill, Plain, $11.00; Adjustable, $12.00.....20&10%
Wilson's Drill Stocks.....10%
Automatic Boring Tools.....$1.75@$1.85

Twist Drills—

Morse.....50&10&5%
Standard.....50&10&5%
Syracuse (Metal list).....50&10%
Cleveland.....50&10&5%
Williams.....50&10&10%
New Process.....50&10&5%
Graham's Pat. Groove Shank 50&10&5%
Diamond, W. & B.....50&10&5%

Drill Bits or Bit Stock Drills—

See Augers and Bits.

Drill Chucks.—See Chucks.

Dripping Pans—See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....30@20&10%
Disston's.....50%
Buck Bros.....30%
Stanley R. & L. Co.'s
Varnished Handles.....65&10%
Black Handles.....60&10%
Sargent & Co.'s
No. 1 Forged Blade.....60&10&10%
Nos. 20, 30 and 60.....60%&10&10%
P. S. & W.....70 %
Knapp & Cowles':
No. 1.....60&10@70%
No. 2.....60&10&10@70&5%
No. 3.....60&5@60&10%
Nos. 4 and 00, Acme and Ideal..50& 5&50&10&5%
Stearns'.....25&10&5%
Gay & Parsons.....35%
Champion.....25&10%
Clark's Pat.....30@33⅓%
Crawford's Adjustable.....30%
Ellrich's Socket and Ratchet..25@25&10%
Allard's Spiral, new list.....25%
Kolb's Common Sense ₩ doz $6.00,25&10%
Syracuse Screw-Driver Bits...30&30&5%
Screw-Driver Bits,.....₩ doz. 50@75¢
Screw-Driver Bits, Parr's.....₩ gro $6.25
Fray's Hol. Hdle. Sets. No. 3, $12.00, 25@25&10%
P. D. & Co.'s all Steel.....50%
Cincinnati.....25&10%
Brace Screw Drivers.....25&10%
Buck Bros.' Screw-Driver Bits.....

Egg Beaters.—See Beaters, Egg.

Egg Poachers.—See Poachers, Egg.

Electric Bell Sets.—See Bells, Electric.

Emery.—No. 4 to No. 54 to Flour, CF

	46 gr.	150 gr.	F. FF.
Kegs, ₩ lb	4½¢	5 ¢	2½¢
½ kegs, ₩ lb	4½¢	5½¢	2½¢
¼ kegs, ₩ lb	5 ¢	5½¢	3 ¢
10-lb cans, 10 in case	6 ¢	6½¢	5 ¢
10-lb cans, less than 10	10 ¢	10 ¢	7½¢

Enameled and Tinned Ware—See Ware, Hollow.

Escutcheon Pins—See Pins, Escutcheon.

Escutcheons.

Door Lock....Same dis as Door Locks.
Brass Thread.....60@60&10%
Wood.....25%

Expanded Metal.

List No. 5.

Lathing.....10%
Fencing, Painted Sheets.....20%
Netting, Painted Sheets.....20%
Door Mats, Galvanized.....25%
Window Guards, Paneled.....15%
Tree Guards, Paneled.....15%

Extractors, Lemon Juice—See Squeezers, Lemon.

Fasteners, Blind—

Mackrell's, ₩ dos. $1.00.....20@20&10%
Van Sand's Screw Pat., $15 ₩ gr..60&10%
Van Sand's Old Pat., $15.00 ₩ gr..55&10%
Austin & Eddy No. 200S ₩ gr.....$9.00
Security Gravity, ₩ gr.....$9.00
Zimmerman's.....45 %

Faucets.—

Fenn's.....40%
Bohren's Pat. Rubber Ball.....25%
Fenn's Cork Stops.....33⅓%
Star.....60%
Fray's Pat. Petroleum.....40&25&2%
B. & L. B. Co.
West's Lock, Open and Shut Key...50%
Star, Metal Plug, new list.....40%
Lockport, Metal Plug, reduced list..60%
Metallic Key, Leather Lined....60&10@ 60&10&10%
Cork Lined.....70&5@70&10%
Burnside's Red Cedar.....50%
Burnside's Red Cedar, bbl lots.....50&10%
John Sommers'
Peerless Best Block Tin Key.....40%
IXL, 1st quality, Cork Lined.....50%
Diamond Lock.....40%
Perfection, Fla. Red Cedar.....50%
Goodenough Cedar.....50%
Boss Metallic Key.....50%
Reliable Cork Lined.....60%
Western Pattern Cork Lined.....50%
Self-Measuring
Enterprise, ₩ doz $33.00.....20&10%
Lane's, ₩ doz $36.00.....25&10%
Victor, ₩ dos $36.00.....25&10%

Felloe Plates—See Plates, Felloe.

Fifth Wheels.—

Derby and Cincinnati.....45&5%
Brewster.....50&5%

Files—

Domestic—

Nicholson Files, Rasps, &c.....60&10@60&10&5%
Nicholson (X. F.) Files.....25%
Nicholson's Royal Files (Seconds).....75%
(extra prices on certain sizes)
G. & H. Barnett (Black Diamond).....60&10@60&10&5%
Eagle.....60&10&5@60&10&10%
Other makers, best brands60&10@60&20%
Fair brands.....60&10&10@70&5%
Second quality.....70&10@75&10%
Heller's Horse Rasps.....50&7½@50&10%
McCaffrey's Horse Rasps.....50&10%
Chelsea Horse Rasps, Hand Cut...50&10%

Imported—

Butcher.....Butcher's list, 20%
Stubs.....Stubs list, 25@30%

Fixtures.

Grindstone—

Sargent's Patent.....70&10%
Reading Hardware Co.....30&10%
P., S. & W. Co.....50&10%

Fluting Machines—See Machines, Fluting.

Fluting Scissors—See Scissors, Fluting.

Fodder Squeezers—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Asso List..65&5@65&10%
Hay, Manure, &c., Phila. List. 60@60&5%
Plated, see Spoons.

Frames—

Saw—

White Vermont.....₩ gro $9.00@10.00
Red, Polished and Varnished.....₩ doz $1.50, 25%

Screen, Window and Door—

Porter's Pat. Window and Door Frame. 33⅓&10%
Warner's Screen Corner Irons..33⅓@ 33⅓&10%
Stearns' Frames and Corners..25@25&10%
Cortland.....40@40&5%

Freezers, Ice Cream—

White Mountain.....60@60&5%
Granite State.....65@65&5%
Arctic.....70@70&5%
American.....60%
Buffalo Champion.....65@65&5%
Shepard's Lightning.....65@65&5%
Gem.....65%
Blizzard.....70%
Double Action Crown.....60%
Crown.....60%
Star.....60%
Peerless.....60&10%
Giant.....60%
Zero.....60&10&10%
Boss and Pet.....60&10&10&10%
Keystone, P. D. & Co., each $1.50.....20%

Fruit and Jelly Presses—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Funnels.

Gersdorff's Perfection, Standard and Globe; 7in, 1 gro., 10 %; 2 to 5 gro., 20 %; 5 to 10 gro.....30 %
Copper, 1 to 6 doz., 15 %; 6 to 12 doz., 20 %; over 12 dos.....35 %

Furnaces, Soldering.

Burgess No. 3 Gem, tin reservoir....$7.00
Burgess No. 3 Gem, copper reservoir. 8.50

Fuse—Dia. 12½%. ₩ 1000 ft

Common Hemp Fuse, for dry ground..$2.10
Common Cotton Fuse, for dry ground 2.35
Single Taped Fuse, for wet ground.. 3.85
Double Taped Fuse, for very wet gr. 4.75
Triple Taped Fuse, for very wet gr.. 5.10
Small Gutta Percha Fuse, for water. 7.10
Large Gutta Percha Fuse, for water. 12.10

Gates, Molasses—

Stebbin's Pattern.....30@35 &5%
Stebbin's Genuine.....60&10&10%
Stebbin's Tinned Ends.....40&10%
Chase's Hard Metal.....50&10%
Bush's.....30%
Lincoln's Pattern.....70@70&10%
Weed's.....30&10%
Boss, ₩ dos:
No. 1, $7; No. 2, $8; No. 3, $9; No. 4 $10.....60&10&10%

Gauges.

Marking, Mortise, &c.....60&10%
Starrett's Surface, Center and Scratch. 25&10%
Wire, Wheeler, Madden & Co.....10%
Wire, Morse's.....25%
Wire, Brown & Sharpe's.....10@20%
Wire, P. S. & W. Co.....10&10%

Gimlets—

Nail and Spike.....50&10&5%
"Eureka" Gimlets.....40&10%
"Diamond" Gimlets.....₩ gr $5.00
Double Cut, Shepardson's.....45@45&5%
Double Cut, Ives'.....60@60&5%
Double Cut, Douglass'.....40&10%
"Bee," ₩ gr $12.....25@25&5%

Glue—

Le Page's Liquid.....25@25&5%
Upton's Liquid.....25%
Improved Process.....25@25&5%

Glue Pots—See Pots, Glue.

Grease, Axle.

Fraser's.....Keg ₩ lb 4¢, Pail ₩ lb 5¢
Fraser's, in boxes.....₩ gr $9.50
Dixon's Everlasting, in bxs...₩ doz 1 lb $1.20; 2 lb $2.00
Dixon's Everlasting....10-lb pails, ea. 85¢
Lower grades, special brands, ₩ gr $5.50@$7.00

Grindstones—

Small, at factory.....₩ ton $7.50@9.00
Family, regular list.....60%
Family, Cleveland Stone Co.....20%

Grindstone Fixtures—See Fixtures Grindstone.

Hack Saws—See Saws.

Hafts, Awl.

Sewing, Brass Fer. ₩ gr, $3.50.....45&10%
Pat. Sewing, Short..$1.00 ₩ dos.....40&10%
Pat. Sewing, Long.....₩ doz $1.20
Pat. Peg, Plain Top. ₩ gr $10.00...45&10%
Pat. Peg, Leather Top. ₩ gr $12.00.45&10%

Halters.

Covert's, Rope, Jute.....60&10&10&2%
Covert's, Rope, 7-16-in., Jute.....70&2%
Covert's, Rope, ½-in. Hemp.....50&2%
Covert's Adj. Rope Halters.....40&2%
Covert's Hemp Horse and Cattle Tie. 50&2%
Covert's Jute Horse Ties.....70&2%
Covert's Jute Cattle Ties.....70&10&2%
Covert's Adj. Web Halters.....35&5&2%

Hammers—

Handled Hammers—

Maydole's, list Dec. 1, '85.....35&10@35%
Buffalo Hammer Co.
Humason & Beckley
Atha Tool Co. } 60@50&10%
Verree.....40&10@—%
C. Hammond & Son.....40&10@—%
Fayette R. Plumb.
Artisans' Choice, A. E. Nail...40&12½%
Regular Y. & P., A. E. Nail.....50%
Horseshoe Turning Hammers.....50%
Other Hammers.....50&10%
Hartford, Nail Hammers.....40&20%
Hartford, Machinists, &c...50&5@50&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 & 1.75.....30&10%
Nelson Tool Works.....40&10%
Warner & Nobles.....30@2%
Feck, Skow & Wilcox.....40%
Sargent's.....33⅓&10%

Heavy Hammers and Sledges—

3 lb and under..... ₩ lb 40¢
3 to 5 lb..... ₩ lb 36¢ } 70@70&10%
Over 5 lb..... ₩ lb 30¢
Wilkinson's Smiths.....10½¢@11¢ ₩ lb

Handcuffs and Leg Irons—See Police Goods,

Handles—

Cross-Cut Saw Handles—

Atkins' No. 1 Loop, ₩ pair, 28¢; No. 3 13¢; No. 6, 16¢; No. 2 and No. 4 Reversible, 18¢.
Champion.....15¢

Iron, Wrought or Cast—

Door or Thumb.

Nos.	0	1	2	3	4
Per doz.	$0.90	1.00	1.10	1.35	1.50

Boggin's Latches.....60&10&10%
Bronze Iron Drop Latches..₩ doz 70¢ net
Jap'd Store Door Handles—Nuts, $1.62
Plate, $1.10; no Plate, $0.85.....net
Barn Door, ₩ doz $1.40.....10&10%
Chest and Lifting.....70%

Wood—

Saw and Plane.....40&10@40&10&5%
Hammer, Hatchet, Axe, &c.....40@40&5%
Brad Awl.....₩ gr $2.00
Hickory Firmer Chisel, ass'd. ₩ gr 4.50
Hickory Firmer Chisel, large. ₩ gr 5.00
Apple Firmer Chisel, ass'd...₩ gr 5.00
Apple Firmer Chisel, large...₩ gr 6.00
Socket Firmer Chisel, ass'd...₩ gr 3.00
Socket Framing Chisel, ass'd. ₩ gr 5.00 } 40&10@60%
I. B. Smith & Co.'s Pat File..... 50%
File, assorted.....₩ gr 2 75
Auger, assorted.....₩ gr 5.00 } 50%
Auger, large.....₩ gr 7.00
Pat. Auger, Ives'.....30&10%
Pat. Auger, Douglass.....₩ set $1 25
Pat. Auger, Swan's.....₩ set $1 00
Hoe, Rake, Shovel, &c.....50&10%

Hangers—

Barn Door, old patterns...60&10&10@70%
Barn Door, New England...60&10&10@70
Samson Steel Anti-Friction.....55%
Orleans Steel.....55%
Hamilton Wrought Wood Track.....55%
U. S. Wood Track.....65%
Champion.....60&10%
Rider and Wooster, Medina Mfg. Co.'s list.....70%
Climax Anti-Friction.....55%
Climax Anti-Friction for Wood Track55%
Zenith for Wood Track.....55%
Reed's Steel Arm.....50%
Challenge, Barn Door.....50%
Sterling.....50@50&10%
Victor, No. 1, $15.00; No. 2, $16.50; No. 3, $18.00.....50&2%
Cheritree.....50&10%
Kidder's.....50&10@60%
Boss.....60&10%
Best Anti-Friction.....60&10%
Duplex (Wood Track).....60&10&5%
Terry's Pat., ₩ doz pr. 4 in, $10.00; 5 in. $12.00.....50&10%
Terry's Steel Anti-Friction Leader 50&10%
Terry's Steel Anti-Friction Ideal..50&10%
Cronk's Patent, Steel Covered.....50@5%
Wood Track Iron Clad, ₩ ft. 10¢.....50 &15@60%
Carrier Steel Anti-Friction.....50&10%
Architect, ₩ set $6.00.....20%
Eclipse.....20&10%
Felix, ₩ set $4.50.....20%
Richards'.....30@30&10%
Lane's Standard.....50&5@50&10%
Lane's New Standard.....50@50&5%
Lane's Parlor.....40%
Ball Bearing Door Hanger..20&10@25&10%
Warner's Pat.....20&10@20&10&10%
Stearns' Anti-Friction.20&10@20&10&10%
Stearns' Challenge.....25&10@25&10&10%
Faultless.....40@40&5%
American, ₩ set $6.00.....20&10%
Rider & Wooster, No. 1, 62½¢; No. 2, 75¢.....40%
Paragon, Nos. 1, 2 and 3.....40&10%
Cincinnati.....25&10%
Paragon, Nos. 5, 5½, 7 and 8.....20&10%
Crescent.....60@60&10%
Nickel Cast Iron.....50%
Nickel, Malleable Iron and Steel....40%
Scranton Anti-Friction Single Strap33⅓%
Wild West, 4 in. Wheel, $15.00; 5 in. Wheel, $21.00.....45%
Star.....40&10@40&10&5%
May.....50&5@50&10%
Barry, $6.00.....40&10%
Interstate.....50%
Magic.....45%
Pendulum, Payson's.....40%

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.
Blood's.....
Hunt's.....
Hurd's.....
Mann's.....
Peck's.....
Underhill's.....
Buffalo Hammer Co.....
Fayette R. Plumb.....
C. Hammond & Son.....
Kelly's.....
Sargent & Co.....
P., S. & W. Co.....
Ten Eyck Edge Tool Co.....
} 40 & 10 @ 50&5 %
Collins.....10%
Schulte, Lohoff & Co.....50@50&5%

Hay and Straw Knives—See Knives.

Hinges—

Blind Hinges—

Parker.....75&2%
Palmer.....50&5&10%
Seymour.....70&2%
Huffer.....50%
Clark's, Nos. 1, 3, 5, 40 and 50 75&10&5@80%
Clark's Mortise Gravity.....50%
Sargent's Nos. 1, 3, 5, 11, 13 75&10@55&10&5%
Sargent's, No. 12.....77&10&10%
Reading's Gravity.....75&10@75&10&5%
Shepard's
Noiseless.....75&10%
Niagara.....80%
Buffalo.....80%
Clark's Genuine Pattern.....80%
O. S., Lull & Porter.....75&10%
Acme, Lull & Porter.....75%
Queen City Reversible....70&10&5@75%
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.....75&10&2½%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%

Gate Hinges—

Western.....₩ doz $4.40, 60%
N. E.....₩ doz $7.00, 55%
B. E. Reversible.....₩ doz $5.20, 55&10%
Clark's, Nos. 1, 2, 3.....60&10&5%
T. Y. Stark.....₩ doz $5.00, 55&10%
Automatic.....₩ doz $12.50, 50%
Common Sense.....₩ doz pair $4.50, 50%
Seymour's.....45&10%
Shepard's.....60&10&5%

Spring Hinges—

Geer's Spring and Blank Butts.....40%
Union Spring Hinge Co.'s list, March 1886.....2 %
Barker's Double Acting.....25%
Union Mfg. Co.....25%
Bommer's.....30%
Buckman's.....15@20%
Chicago.....30%
Bardsley's Patent.....40%
Acme.....30%
U. S.....25&10%
Empire and Crown.....20%
Hero and Monarch.....55%
American, Gem, and Star.....20%
Oxford.....20%
Wiles'.....10%
Devore's.....40%
Rex.....40%
Royal.....60%
Reliable.....60%
Champion.....55%
Stearn's.....50&10%
Samson, ₩ gross.....$14.00
} Extra 5@10 % often given.

Wrought Iron Hinges.
List February 14, 1891.
Strap and T.....50&10%
Corrugated Strap & T.50&10@50&10&10%
Screw Hook and Strap..... { 6 to 12 in., ₩ D., 4¢ / 14 to 20 in., ₩ D. 3½¢ / 22 to 36 in., ₩ D., 3¢
Screw Hook and Eye..... { ⅛ in., ₩ D 7½¢ / ¼ in., ₩ D 5½¢ / ⅜ in., ₩ D 4½¢
Rolled Blind Hinges, Nos. 33 and 34 50&10%
Rolled Blind Hinges, Nos. 232 and 234 55&10%
Rolled Plate.....70&10%
Rolled Raised.....70&10%
Plate Hinges "Providence" { 8, 10 & 12 in., ₩ D.....5¢ / over 12 in., ₩ D.....4¢

Hoes—

Eye—

D. & H. Scovil.....20%
Lane's Crescent Planters Pattern..45&5%
Lane's Razor Blade, Scovil Pattern...30%
Maynard, S. & O. Pat.....45&5%
Sandusky Tool Co., S. & O. Pat. } 50&10&5 @60%
Am. Axe and Tool Co., S. & O. Pat. }
Chattanooga Tool Co., S. & O. Pat..60& 5@60&10%
Grub.....60&10%

Handled—

Garden, Mortar, &c.....70%
Planter's, Cotton &c.....70%
Warren Hoe.....60%
Magic.....₩ doz $4.00

Hog Rings and Ringers—See Rings and Ringers.

Hoisting Apparatus—See Machines, Hoisting.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag.

Sprengle's Pat.....₩ doz $18.....60%

Bit.

Extension,
Barber's, ₩ doz $15.00.....40@40&10%
Ives, ₩ doz $20.00.....60&5@60&10%
Diagonal.....₩ doz $24.00, 40%
Angular.....₩ dos $24.00, 40&5%

File and Tool—

Bals Pat.....₩ doz $4.00; 25%
Nicholson File Holders.....20%
Dick's Tool Holder.....30%

Hooks—

Cast Iron—

Bird Cage, Sargent's list.....
Bird Cage, Reading.....
Clothes Line, Sargent's list..
Clothes Line, Reading list. 60&10@60&10&10%
Ceiling Sargent's list.....55&10&10%
Harness, Reading list..55&10@55&10&10%
Coat and Hat, Sargent's list. 55&10@60&10%
Coat and Hat, Reading.50&10@50&10&10%

Wrought Iron—

Cotton.....₩ doz $1.25
Cotton Pat. (N.Y. Mallet & Handle W'ks). 30%
Tassel and Picture (T. & S. Mfg. Co.)...50%
Wrought Staples, Hooks, &c. See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1886.....60@60&10%
Wire Coat and Hat, Miles', list April, 1886.....50@55&10%
Indestructible Coat and Hat...45@45&5%
Wire Coat and Hat, Standard.60@60&10%
Handy Hat and Coat.....50&10@60%
Steady Ceiling Hooks.....50&10@60%
Belt.....80@80&10%
Atlas, Coat and Hat.....60@60&1%
Bright Wire Goods, see *Wire*.

Miscellaneous.

Grass, No. 2, $2.00; No. 3, $2.25; No. 4, $2.50
Nolin's Grass.....₩ doz $2.25
Bush.....55@60%
Whiffletree—Patent.....55%
Hooks and Eyes—Malleable Iron. 70@70&10%
Hooks and Eyes—Brass.....60&10&10%
Fish Hooks, American.....50%
Bench Hooks.....See Bench Stops.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

Hose, Rubber—

Competition.....75@75&5%
Standard.....60&10&5@60&10&10%
Extra.....40&10@60%
N. Y. B. & P. Co., Para.....25&5%
N. Y. B. & P. Co., Extra.....40@40&5%
N. Y. B. & P. Co., Dundee....50&10 @ 60%

Huskers—

Blair's Adjustable.....₩ gr $8.00
Blair's Adjustable Clipper....₩ gr 7.00
Hubbard's Solid Steel.....₩ gr 4.50

Indurated Fiber-Ware—See Ware, Indurated Fiber.—

Irons.

Sad—

From 4 to 10, at factory....₩ 100 ℔, $2.30@$2.40
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'....₩ doz $18.00 net
Mrs. Pott's Irons..... 60@60&10%
Enterprise Star Irons.....60@60&10%
XX Cold Handle Sad Iron.....50&5@60%
Ideal Irons new list.50&10@50 & 10&10%
Salamander, Irons.....25%
B. B. Sad Irons, ₩ ℔.....3 @3½¢
Combined Fluter and Sad Iron, ₩ doz, $15.00.....15%
Fox Reversible, Self-Fluter ₩ doz $24.00
Chinese Laundry (N.E. Butt Co.) 8½¢, 15%
New England.....5¢, 15%
Mahony's Troy Pol. Irons.....25%
Sensible, list Jan. 91.....50&10&5%
Sensible Tailor's Irons.....33⅓ %
National Self-Heating.....30 %

Soldering—

Soldering Coppers.....₩ ℔ 22 @ 23¢
Covert's Adjustable, list Jan. 1 1886. 55&2%

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy.....40%
Victor.....40%
Lockport.....40%

Kettles—

Brass, Spun, Plain, list Jan. 1, '91..25&5%
Brass, Spun, Pld. W.M. list Jan. 1, '91.20%
Enameled and Tea—See Hollow Ware.

Keys—

Lock Asso'n list Dec. 30, 1886...50&10@ 60&5%
Eagle, Cabinet, &c.....33⅓&2%
Hotchkiss' Brass Blanks.....40%
Hotchkiss, Copper and Tinned.....40%
Hotchkiss' Pad. and Cab.....35%
Ratchet Bed Keys.....₩ doz $4.00, 15%
Wollensak Tinned.....50&10%

Knife Sharpeners—See Sharpeners, Knife.

Knives.

Butcher, Shoe, &c—

Wilson's Butcher Knives, List Dec. 8, 1890.....25%
Ames' Butcher Knives.....25%
Foster Bros.' Butcher, &c.....40%
Jordan's A.A.A.I, Butchers', list.....net
Nichols' Butcher Knives.....40&10%
W. W. Wilson, Butcher, 6 in., $2.00; 7 in., $2.70; 8 in., $3.80, &c.
Ames' Shoe Knives.....20@25%
Ames' Bread Knives. ₩ doz $1.50, 15@20%
Moran's Shoe and Bread.....20%
Hay and Straw.....See Hay Knives.
Table and Pocket.....See Cutlery.
Corn, Auburn Mfg. Co. Western Pat., $2.00
Corn, Auburn Mfg. Co. Crescent.....$3.50

Corn—

Bradley's.....10%
Wadsworth's.....25%

Drawing—

Witherby.....
P. S. & W.....
Mix.....
New Haven.....
} ..75 @ 75&10 %
Merrill.....60&10@60&10&5%
Douglas.....75@75&5%
Watrous.....15&10@25%
L. & I. J. White.....20&5%
Bradley's.....35%
Adjustable Handle.....25@33⅓%
Wilkinson's Folding.....25@25&5%

Hay and Straw—

Lightning, from jobbers....$8.00 @ $9.00
Wadsworth's.....40&7½@40&10%
Carter's Needle.....₩ doz $11.00@$11.50
Heath's.....₩ doz $13.00@13.50
Auburn Hay, Corn and Spear Point..50%
Auburn, Straw.....40%
Nolin's Hay.....₩ doz. $7.00 @ $8.00

Mincing.

Am. (2d quality), ₩ gr., 1 blade, $7; 2 blades, $12; 3 blades, $18.....net
Lothrop's.....20&10%
Smith's, ₩ doz, Single, $2.00; Double, $3 40@45%
Knapp & Cowles.....50&10@60%
Buffalo Adjustable.....₩ doz $3.00 .25%
Buffalo Double Adj'table. ₩ doz $3.00 25%

Knobs—

Door Mineral.....60@65%
Door Por. Jap'd.....70@75%
Door Por. Nickel.....$2.00@2.25
Door Por. Plated, Nickel.....$2.00@2.25
Drawer, Porcelain.....60&10@60&10&10%
Hemacite Door Knobs.....40&10@50%
Yale & Towne Wood, list Dec., 1885...40%
Furniture Plain.....75¢ gro inch, 10%
Furniture, Wood Screws.....25&10%
Base, Rubber Tip.....70&10&5%
Picture, Judd's.....60&10&10@70%
Picture, Sargent's.....70&10%
Picture, Hemacite.....35&5%
Shutter, Porcelain.....65&10%
Carriage, Jap.....₩ gro 80¢, 60&10%
Bardsley's Wood Door, Shutter, &c..40%

Ladles—

Melting, Sargent's.....55&10%
Melting, Reading.....35&10%
Melting, Monroe's Pat...₩ doz $4.00, 40%
Melting, P. S. & W.....35&10@40%
Melting, Warner's.....30%

Lanterns—

Tubular—

Plain with Guards, ₩ doz.....$3.75@4.00
Lift Wire, with Guards.....$4.00@4.25
Square Plain, with Guards.....$3.75@4.00
Sq. Lift Wire, with Guards.....$4.50

Police Lanterns (including packages).

2¾-inch Bull's-eye Police regular..... ₩ dos $3.60
3-inch Bull's-eye Police regular..... ₩ doz $3.90
2¾-inch Bull's-eye Police flash light..... ₩ doz $4.00
3-inch Bull's-eye Police flash light..... ₩ doz $4.50

Lawn Mowers—See Mowers, Lawn.

Leaders, Cattle.

Humason, Beckley & Co.'s.....70%
Sargent's.....60@&10%
Hotchkiss.....30%
Peck, Stow & W. Co.....60&10%

Lemon Squeezers—See Squeezers, Lemon.

Lifters, Transom.

Wollensak's:
Class 3 and 4, Bronzed Iron.....50%
Class 3 and 4, Bronze Metal.....25%
Class 3 and 4, Brass.....35%
Skylight Lifters.....35%
Crown, Eagle and Shield.....50%
Reiher's, list Feb. 20, 1891.
Bronzed Iron Rods.....50&10&10&2½
Brass, Real Bronze or Nickel Plate..30%
Excelsior.....50&10&1 %
Shaw's.....50&10%
Payson's:
Universal.....60%
Solid Grip.....60&10%
Imperial.....50&10%

Lines—

Cotton and Linen Fish, Draper's.....50%
Draper's and Tate's Chalk.....60%
Draper's Masons' Linen, 84 ft., No. 1, $1.25; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25.....25%
Cotton Chalk.....55%
Samson Cotton, No. 4, $2; No. 4½, $2.50; 10%
Silver Lake, Braided, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gro.....25%
Mason's Linen, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50,
Mason's Colored Cotton.....45%
Wire Clothes. Nos. 18 19 20
100 ft.....$3.50 $3.00 $2.50
Ventilator Cord, Samson Braided, White or Drab Cotton..₩ doz $7.50, 20%

Links, Open.

Terry's—per gro.:
Nos..... 1 2 3 4
$6.00 8.00 12.00 16.00

Locks, &c.—

Cabinet—

Eagle, Gaylord Parker and Corbin... } List March, '84, rev. Jan. 1, '85..33⅓&2%
Delta, Nos. 36 to 39.....40%
Delta, Nos. 51 to 63.....40&10%
Delta, Nos. 86 to 96.....30%
Stoddard Lock Co.....30&33⅓%
"Champion" Night Latches.....40%
Barnes Mfg. Co.....40@40&10%
Eagle and Corbin Trunk.....25&2%
"Champion" Cab. and Combin...33⅓%
Yale.....net prices
Romer's.....25%

Door Locks, Latches, &c.

R. & E. Mfg. Co., list Mar. 20, 1880..... } 65&10@70% Much lower net prices often made.
Mallory, Wheeler & Co., list July, '88.....
Sargent & Co., list Aug. 1, '88
Reading Hardware Co., list Feb. 2, '88.....
Brittan, Graham & Mathes, list Jan. 1890.....60&10&10%
Perkins' Burglar Proof.....60&25%
Plate.....33⅓&2%
Barnes Mfg. Co.....40@40&10%
Yale.....net prices
Deltz Flat Key.....30%
L. & C. Round Key Latches.....30&10%
L. & C. Flat Key Latches.....33⅓&10%
Romer's Night Latches.....15%
Brooklyn Latches.....50&10%
Shepardson or U. S.....35%
Seed's N. Y. Hasp Lock.....20%

Padlocks—

List June 10, 1891.....50&2%
Norwich Lock Mfg. Co., old list...70&2%
Yale Lock Mfg. Co.'s.....net prices
Eagle.....25&2%
Eureka, Eagle Lock Co.....40&2%
Romer's, Nos. 0 to 91.....30%
Romer's Scandinavian, &c., Nos. 100 to 505..15%
A. E. Deits.....40%
Champon Padlocks.....40%
Hotchkiss.....30%
Star.....45%
Horseshoe.....₩ dos, $9. 40@40&10%
Barnes Mfg. Co.....40@40&10%
Nock's.....30%
Brown's Pat.....25%
Scandinavian.....90@90&10%
E. T. Fraim's Keystone Scandavian. Nos. 119, 120, 130 and 140.....90&10% Other Nos.....65%
Ames Sword Co. up to No. 150.....40%
Ames Sword Co. above No. 150.....50%
Slaymaker Barry & Co.
No. 1010 line.....35&5%
No. 41 line.....45&10%
No. 61 line.....50&5%
No. 21 line.....75%

Sash, &c.

Clark's, No. 1, $10; No. 2, $8 ₩ gr..33⅓%
Ferguson's.....33⅓%
Victor.....60&10&2%
Walker's.....10%
Attwell Mfg. Co.....25&33⅓%
Reading.....66⅔&10@66⅔&10&10%
Hammond's Window Springs.....40%
Common Sense, Jap'd, Cop'd and Br'zed.....₩ gr $4.00
Common Sense, Nickel Plated ₩ gr $10.00
Universal.....30%
Kempshall's Gravity.....60%
Kempshall's Model.....60@60&10%
Corbin's Daisy, list Feb. 15, 1886.....70%
Payson's Perfect.....60&10%
Hugunin's Sash Balances.....25&5&2%
Hugunin's New Sash Locks.....25&5&2%
Stoddard "Practical".....10%
Ives' Patent.....60&10@60&10&5%
Lieschе's, No. 100, ₩ gr $8; 105, $10..30%
Davis, Bronze, Barnes Mfg. Co.....50%
Champion Safety, list January, 1889..70%
Security.....70%

Lumber Tools—See Tools, Lumber

Lustre—

Four-ounce Bottles....₩ dos, $1.75; ₩ gross.....$17 0

Machines.

Boring—

	Without Augers.	Upright.	Angular.
Douglas	$5.50	$6.75	50%
Snell's, Rice's Pat.	5.50	6.75	40&10@10%
Jennings	5.50	6.75	45@45&10%
Other Machines...	2.25	2.75	
Phillips' Patent with Augers	7.00	7.50	...
Miller's Falls	7.50		25%

Fluting.

Knox, 4½-inch Rolls.....$3.25 each } 35%
Knox, 6-inch Rolls.....$3.60 each }
Eagle, 3½-inch Roll, $2.15..... 35%
Eagle, 5½-inch Roll, $2.85..... 35%
Crown, 4½ in., $3.50; 6 in., $4.00; 8 in., $6.50 each..... 35%
Crown Jewel 6 in.....$5.50 each, 35%
American, 5 in., $3.00; 6 in., $3.40; 7 in., $4.50 each..... 35%
Domestic Fluter.....each, $1.50
Geneva Hand Fluter, White Metal ₩ doz $12, 25%
Crown Hand Fluter, Nos. 1, $15.00; $12.50; 3, $10.00..... 30%
Shepard Hand Fluter, No. 85 ₩ dos 18 20..... 40%
Shepard Hand Fluter, No. 110 ₩ dos $11.00..... 40%
Shepard Hand Fluter, No. 95 ₩ dos $8.00..... 40%
Clark's Hand Fluter, ₩ dos $15.00.....35%
Combined Fluter and Sad Iron, ₩ dos $15.00.....30%
Buffalo ₩ dos $10.00.....10%

Hoisting—

Moore's Hand Hoist, with Lock Brake.....20%
Moore's Differential Pulley Block...40%
Energy Mfg. Co's.....25%
Sure Grip Steel Tackle Blocks.....25%

Washing—

Anthony Wayne, ₩ dos No. 1, $51 No. 2, $45; No. 3, $42.
Western Star ₩ doz No. 2, $45 No 3, $48.

Mallets.
Hickory.....20&10@20&10&10%
Lignumvitæ.....20&10@20&10&10%
B. & L. Block Co., Hickory & L. V. 30@30&10%

Mattocks. Regular list. 60&10@60&10&5%

Measures—
Standard Fiberware, No. 1, peck, ₩ dozen, $4; ½-peck, $3.50.

Meat Cutters—See Cutters, Meat.

Menders, Harness—
Per doz.....$2.00

Mills.
Coffee—
Box and Side, List Jan. 1, 1888. 60&10@—%
American, Enterprise Mfg Co. 20&10@30%
The Swift, Lane Bros.....20&10%

Mincing Knives — See Knives, Mincing.

Molasses Gates—See Gates, Molasses.

Money Drawers — See Drawers, Money.

Mowers, Lawn.
Pennsylvania, New Model, Excelsior, Continental, &c.....60@60&5%
Philadelphia.....60&10%
Perfection.....60&10&10%
Easy.....60&10@60&10&5%
Bay State.....60&10@60&10&5%
Other Machines.....60&10&5@70%

Muzzles—
Safety.....₩ doz., $3.00, 25%

Nails,
Cut and Wire. See Trade Report.
Wire Nails, Papered.
Association list, July 15, '89. 75&10@80%
Tack Mfrs.' list.....70@70&10%
Wire Nails, Standard Penny.
Card June 1 '89 base.....$2.10 @ $2.20

Horse—

	Nos. 6	7	8	9	10	
Ausable.....	.28¢	26¢	25¢	24¢	23¢.	40&5&5&2%
Clinton, Fin..	19¢	17¢	16¢	15¢	14¢	80%
Essex.....	.28¢	26¢	25¢	24¢	23¢.	40&5&5&2%
Lyra.....	19¢	17¢	16¢	15¢	14¢	30 %
Snowden	19¢	17¢	16¢	15¢	14¢..	30 %
Putnam.....	.23¢	21¢	20¢	19¢	18¢.	1000 ℔ in year 15%
Vulcan.....	.23¢	21¢	20¢	19¢	18¢.	.12½&5%
Northwest'n.	26¢	23¢	22¢	21¢	20¢.	25@25&5%
Globe.....	.23¢	21¢	20¢	19¢	18¢.	20&5&5%
Boston.....	.23¢	21¢	20¢	19¢	18¢.	20&5&5%
A. C.....	.25¢	23¢	22¢	21¢	21¢.	25&10@33⅓&5%
C. B.-K.....	.25¢	23¢	22¢	21¢	21¢.	25&10@33⅓&5%
Maud S.....	.25¢	23¢	22¢	.1¢	21¢.	40&10 %
Champlain ..	28¢	26¢	25¢	24¢	23¢.	25&1C&10%
Saranac.....	.25¢	21¢	20¢	19¢	18¢.	.30&10%
Champion ...	25¢	23¢	22¢	21¢	20¢.	10&10&10%
Capewell....	.28¢	26¢	5¢	24¢	23¢.	35&5@35&10%
Star.....	.23¢	21¢	20¢	19¢	18¢.	10&10@10&12½%
Anchor.....	.23¢	21¢	20¢	19¢	18¢	.35%
Western.....	.23¢	21¢	20¢	19¢	18¢	.40&10%
Empire Bronsed						.14 ₩ ℔.

Picture—
Brass Head, Sargent's list.....50&10&10%
Brass Head, Combination list.....50&10%
Porcelain Head, Sargent's list. 50&10&10%
Porcelain Head, Combination list. .40&10%
Niles' Patent.....40%

Nail Pullers.—See Pullers, Nail.

Nail Sets.—See Sets, Nail.

Nut Crackers.—See Crackers, Nut.

Nuts—List Dec. 18, 1889.

	Square.	Hex.
Hot Pressed.....	5.35¢	5.95¢ off list.
Cold Punched.....	5.00¢	5.10¢ off list.

In packages of 100 ℔, add 1-10¢ ₩ ℔. net; in packages less than 100 ℔, add ½¢ ₩ ℔, net.

Oakum—
Best or Government.....₩ ℔ 7@7½¢
U. S. Navy.....₩ ℔ 6@6¼¢
Navy.....₩ ℔ 5½@6¢

Oilers—
Zinc and Tin.....65&10@70%
Brass and Copper.....50&10@50&10&5%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz. 10@10&5%
Malleable, Hammers, Old Pattern, same list.....40%
Prior's Pat. or "Paragon" Zinc, 60&10&10%
Prior's Pat. or "Paragon" Brass.....50%
Olmstead's Tin and Zinc.....60%
Olmstead's Brass and Copper.....50%
Broughton's Zinc.....60%
Broughton's Brass.....50%
Gem P. D. & Co. ₩ gro. $2
Steel, Draper and Williams.....50%

Openers, Can.
Messenger's Comet.....₩ doz $3.00, 25%
American.....₩ gross $2.75@$3.00
Duplex.....doz 25¢, 15@20%
Lyman's.....₩ doz $3.75, 20%
No. 4 French.....₩ doz $2.25, 55@60%
No. 5, Iron Handle.....₩ gr $6.00, 45&50%
Eureka.....₩ doz $3.50, 10%
Sardine Scissors.....₩ doz $2.75@3.00
Star.....₩ doz $2.75
Sprague, No. 1, $2.00 2, $2.25; 3, $2.50. 50&10&10%
Excelsior No. 1 $2.50; No. 2, $1.50.....40%
World's Best, ₩ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00.....50&10%
Universal, ₩ doz $3.00.....55&5%
Domestic, ₩ doz $2.50.....45%
Champion ₩ doz $2.00.....5(

Packing, Steam—
Rubber—
Standard.....60&5@65%
Extra.....50&50&5%
N. Y. B. & P. Co., Standard.....50%
N. Y. B. & P. Co., Empire.....60%
N. Y. B. & P. Co., Salamander.....25%
Jenkins' Standard. ₩ ℔ 80¢.....35@35&5%
Miscellaneous—
American Packing.....10¢@11¢ ₩ ℔
Russia Packing.....14¢ ₩ ℔
Italian Packing.....13¢@14¢ ₩ ℔
Cotton Packing.....15¢@17¢ ₩ ℔
Jute.....7¢@8¢ ₩ ℔

Padlocks—See Locks.

Pails.
Galvanized Iron—

	Quarts	10	12	14
Hill's Light Weight, ₩ doz.		$2.75	3.00	3.25
Hill's Heavy Weight, ₩ dz.		3.00	3.25	3.75
Helwig's		2.50	2.75	3.00
Sidney Shepard & Co.		2.35	2.85	3.05
Iron Clad		2.50	2.75	3.00
Fire Buckets		2.75	3.25	3.50

Buckets, see Well Buckets.
Indurated Fibre Ware—25%

Star Pails, 12 qt	₩ doz	$5.40
Stable and Milk, 14 qt	₩ doz	6.00
Fire Pails, deep	₩ doz	5.40
" ½ round bottom	₩ doz	3.80

Standard Fibre Ware—

	Plain.	Deer'd
Water Pails, 12 qt., per doz.	$4.00	$4.50
Dairy Pails, 14 qt., per doz.	4.50	5.00
Fire Pails, No. 1, 12 qt. per doz	4.50	
Fire Pails, No. 2, 14 qt. per doz	5.00	
Sugar Pails	6.00	6.50
Horse Pails	5.00	
Buggy Pails	4.00	
Slop Jars (bal. trap)	8.00	9.00
Chamber Pails, 14-qt	6.50	7.50

Pans.
Dripping.
Smalls izes. ₩ ℔ 6¼¢
Large sizes. ₩ ℔ 5½¢
Silver & Co. (Covered).....40%
Fry—
Standard List:

No.	0	1	2	3	4
₩ doz.	$3.00	$3.75	$4.25	$4.75	$5.25
No.	5	6	7	8	
₩ doz.	$6.00	$7.00	$8.00	$9.00	

Polished, regular goods.....75@75&10%
Acme Fry Pans .....60&10%
Dust—
Steel Edge, No. 1. ₩ doz $1.75

Paper and Cloth—
Sand and Emery—
List April 19, 1886.....50@50&10%
Sibley's Emery and Crocus Cloth.....30%

Parers.
Apple.

Advance	₩ doz	$4.75
Baldwin	₩ doz	5.25
Bonanza	each	5.00
Daisy	₩ doz	4.00
Dandy	each	7.50
Eclipse	₩ doz	4.25
Eureka, 1888	each	16.00
Family Bay State	₩ doz	12.00
Favorite	₩ doz	5.00
Gold Medal	₩ doz	4.00
Ideal.	₩ doz	4.00
Improved Bay State.	₩ doz	27.00 @ 30.00
Little Star	₩ doz	4.50
Monarch	₩ doz	13.50
New Lightning	₩ doz	5.50
Oriole	₩ doz	4.00
Penn	₩ doz	4.00
Perfection	₩ doz	4.00
Pomona	₩ doz	4.00
Rocking Table	₩ doz	6.00
Turn Table	₩ doz	4.50
Victor	₩ doz	13.50
Waverly	₩ doz	4.00
White Mountain	₩ doz	4.00
72	₩ doz	4.25
78	₩ doz.	7.00

Potato—

White Mountain	₩ doz	$4.50
Antrim Combination	₩ doz	$5.50
Hoosier	₩ doz	$13.50
Saratoga	₩ doz	$5.50

Pencils—

Faber's Carpenters'	high list 50%
Faber's Round Gilt	₩ gro $5.25
Dixon's Lead	₩ gro $4.50
Dixon's Lumber	₩ gro $6.75
Dixon's Carpenters'	10%

Picks—
Railroad or Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00.....60&10@60&10&5%

Picture Nails.—See Nails, Picture.

Pinking Irons.—See Irons, Pinking.

Pins.
Bow—
Humason, Beckley & Co.'s.....60&10%
Sargent & Co's....$17 and $18.....60&10%
Peck, Stow & W Co....50&10&50&10&5%
Curtain—
Silvered Glass.....net
White Enamel.....net
Escutcheon,
Iron, list Nov. 11, 1885..50&10@50&10&5%
Brass.....60@60&5%

Pipe, Wrought Iron—
List September 18, 1889.

1¼ and under, Plain	57½%
1¼ and under, Galvanized	47½%
1¼ and over, Plain	67½%
1¼ and over, Galvanized	55%

Boiler Tubes,

Sizes up to 2¾ in. inclusive	55%
Sizes 3 to 6 in. inclusive	65%
Sizes 7 in. and up	65%
Casing	55%
Steel Boiler Tubes	30%

Planes and Plane Irons—
Wood Planes—
Molding.....40&10%
Bench, First Quality.....60&10%
Bench, Second Quality.....55&10%
Bailey's (Stanley R. & L. Co.)..... 40&10%
Iron Planes—
Bailey's (Stanley R. & L. Co.)..... 40&10@40&10&10%
Miscellaneous Planes (Stanley R. & L. Co.) 20&10@20&10&10%
Victor Planes (Stanley R. & L. Co.). 20&10@20&10&10%
Steer's Iron Planes.....35@35&10%
Meriden Mal. Iron Co.'s.....40@40&10%
Davis's Iron Planes .....40@40&10%
Birmingham Plane Co.....50@50&10%
Gage Tool Co.'s Self-Setting...30&10&10%
Chaplin's Iron Planes .....40@40&10%
Sargent's ..... 30&10@30&10&10%
Standard Tool Co.....50@50&5%
Plane Irons—
Butcher's.....$5.00@$5.25 to 2
Buck Bros 30%
Auburn "Thistle.....
Ohio.....} ...30&10%
Sandusky.....
S. & I. J. White.....35%

Plates.
Felloe ₩ ℔ 6¢@6½¢

Pliers and Nippers—
Button's Patent.....50@50&10%
Hall's No. 2, 5 in., $13.50; No. 4, 7 in. $21.00 ₩ doz .....30&10@33⅓&5%
Humason & Beckley Mfg. Co..50@50&10%
Lindsay's Giant.....40%
Gas Pliers.....60%
Gas Pliers, Custar's Nickel Plated..60&5%
Eureka Pliers and Nippers 40%
Russell's Parallel.....25%
P. S. & W. Cast Steel 50%
P. S. & W. Tinners' Cutting Nippers, add 6% dis 10%
Carew's Pat. Wire Cutters.....20%
Morrill's Parallel, ₩ doz, $12.00....30&5%
Cronk's 8 in., $15.00; 10 in. $21.00, 40@40&5%

Plumbs and Levels—
Regular List .....70&10@70&10&10%
Disston's.....50%
Pocket Levels.....70&10@70&10&10%
Davis Iron Levels.....30%
Davis' Inclinometers .....10&10%

Pouchers.
Egg.
Buffalo Steam Egg Poachers, ₩ doz, No. 1, $6.00; No. 2, $9.00.....25%
Silver & Co., 6-Ring..₩ doz $4; 8-Ring $2

Pokes, Animal—
Bishop's I. X. L.....₩ doz $6.00
Bishop's O. K.....₩ doz $5.25
Bishop's Pioneer.....₩ doz $3.75
Bishop's American.....₩ doz $2.75
Eagle, Double Stale.....₩ doz $5.75
Eagle, Single Stale.....₩ doz $3.75
Buckeye, Single Stale.....₩ doz $2.75

Police Goods.
R. I. Tool Co., Handcuffs, $15.00 ₩ doz 10%
R. I. Tool Co., Leg Irons, $35.00 ₩ doz 10%
Tower's.....25%
Daley's Improved Handcuffs: 2 Hands, Polished, ₩ doz $48.00; Nickeled, $57.00; 3 Hands, Polished, ₩ doz $72.00; Nickeled, $84.00.....25%
J. P. Lovell's Police Goods.....25%

Polish, Metal.
Prestoline.....30%
Prestoline Paste.....33⅓%
Gaston's Silver Compound.....33⅓%

Polish, Stove.
Joseph Dixon's.....₩ gro $6.00, 10%
Gem.....₩ gro $4.50, 10%
Gold Medal.....₩ gro $6.00, 25%
Mirror .....₩ pro $6.00, —%
Lustro .....₩ gro $4.75
Ruby.....₩ gro $3.75
Rising Sun, 5 gro lots .....₩ gro $5.50
Dixon's Plumbago.....₩ ℔ 8¢
Boynton's Noon Day, ₩ gro 13.00
Parlor Pride Stove Enamel..₩ gro
Yates' Liquid, 2 3 5 10 gal....
₩ gal ...$0.80 .70 .60 .50
Yates Standard Paste Polish, 10-℔ cans, ₩ ℔ 12½¢
Jet Black .....₩ gro $3.50
Japanese. .....₩ gro $3.50
Fireside.....₩ gro $2.50
Diamond O. K. Enamel.....₩ gro $19.00
Bonnell's Liquid Stove Polish..₩ gro $9.00
Bonnell's Paste Stove Polish..₩ gro $6.00
Black Eagle Bensine Paste, 5 and 10 ℔ cans .....12½¢
Black Jack Water Paste, 5 and 10 ℔ cans .....12½¢
Nickel Plate Paste .....₩ gro $6.00
Crown Paste .....₩ gross, $7.20
Crown Paste, in 5 and 10 ℔ pails ₩ ℔ 12¢
Black Flag .....₩ gross, $7.20
Black Flag, 5 and 10 ℔ pails,.... ₩ ℔, 12¢
Black Flag, liquid, in bottles, ₩ gro..$8.00
Diamond Rock Nickel Cleaner..₩ gro $10.20

Poppers, Corn—
Round or Square, 1 qt..₩ gr $10.00@10.50
Round or Square, 1½ qt..₩ gr $15@15.50
Round or Square, 2 qt..₩ gr $18.50@19.00

Post Hole and Tree Augers and Diggers—See Diggers, Post Hole, &c.

Potato Parers—See Parers, Potato.

Pots.
Glue—
Tinned.....40&10@40&10&5%
Enameled.....40&10@40&10&5%
Family, Howe's "Eureka".....40%
Family, L. F. C.'s "Handy" 50%

Presses.
Fruit and Jelly—
Enterprise Mfg. Co.....20&10@30%
Henis.....₩ doz $3.50
Shepard's Queen City 40%
Silver & Co.....₩ doz $2.75

Pruning Hooks and Shears.—See Shears.

Pullers.
Nail.
Scranton.....₩ doz $18.00, 33⅓%
Curtiss Hammer.....₩ doz $9.00
Giant, No. 1.....₩ doz. $18.00, 10%
Giant, No. 2.....₩ doz, $15.00, 10%
Pelican.....₩ doz, $9.00, 25%
Eclipse.....each, $2.00 net

Pulleys—
Hot House, Awning, &c.....60&10%
Japanned Screw.....60&10%
Brass Screw.....60&10%
Japanned Side.....66⅔&10%
Japanned Clothes Line.....60&10%
Empire Sash Pulley.....55@60%
Moore's Sash, Anti-Friction.....50%
Hay Fork, Solid Eye, $4.00; Swivel, $4.50.....50&10@50&10&5%
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70 .....50%
Hay Fork, "F" Common and Pat. Bushed.....20%
Hay Fork, Tarbox Pat. Iron.....20%
Hay Fork, Reed's Self-Lubricating ...50%
Shade Rack 45%
Tackle Blocks.....See Blocks
Moore's Anti-Friction 5 in. Wheel, ₩ doz $12.00.....40%

Pumps—
Cistern, Best Makers .....60@60&10%
Pitcher Spout, Best Makers.....67½@70%
Pitcher Spout, Cheaper G'ds..75@75&10%

Punches—
Saddlers' or Drive, good, ₩ doz...60@65%
Bemis & Call Co.'s Cast Steel Drive..50&5%
Bemis & Call Co's Springfield Socket..50&5%
Spring, good quality....₩ doz $2.50@2.80
Spring, Leach's Pat.....15%
Bemis & Call Co.'s Spring and Check ..40%
Solid Tinners', P. S. & W. Co., ₩ doz $1.44, 55%
Tin'rs' Hollow Punches P. S. & W. Co. 30&2%
Rice Hand 2 unches 15%
Avery's Revolving.....40%
Avery's Saw-Set and Punch. See Saw Sets.

Rail—
Sliding Door, Wr't Brass, ₩ ℔ 35¢.....15%
Sliding Door, Bronsed Wr't Iron.. ₩ ft. 7¢
Sliding Door, Iron, Painted, ₩ foot 4¢, 40%
Barn Door. Light. In. ½ ¾ 1
Per 100 feet..... $2.00 2.50 3.10, 10%

B. D. for N. E. Hangers—

	Small.	Med.	Large.
Per 100 feet	$2.15	2.70	3.25..net

Terry's Steel Rail, ₩ foot.....4½¢
Victor Track Rail, 7¢ ₩ foot.....50&5%
Carrier Steel Rail, ₩ foot .....4½¢
Moore's Wrought Iron.....25%

Rakes—
Cast Steel, Association goods...66⅔&70%
Cast Steel, outside goods .....60&10&10@70&5%
Malleable .....70@70&5%
Gibbs Lawn Rake.....$12.00, 50&15%
Canton Lawn Rake.....$9.00, 50&10%
Ft. Madison Prize Bow Brace and Peerless 65%
Fort Madison Steel Tooth Lawn Rake, $6.00.....25%

Razors—
J. R. Torrey Razor Co 30%
Wostenholme and Butcher, $10.00 to £, 10%
Jordan's AAAI, new list.....net
Jordan's Old Faithful, new list.....net
Galvanic.....₩ doz $15.00

Razor Strops—See Strops, Razor.

Rings and Ringers.
Bull Rings—
Union Nut Co.....55%
Sargent's.....66⅔&10@70&5%
Hotchkiss' low list.....30%
Humason, Beckley & Co.'s.....70&10%
Peck, Stow & W. Co's..50&10@50&10&10%
Ellrich Hdw. Co., White Metal, low list. 50@50&10%
Hog—
Top of the Hill Ringers.....₩ doz $2.00
Top of the Hill Rings.....₩ doz $1.25
Hill's Improved Ringers.....₩ doz $1.25
Hill's Old Style Ringers.....₩ doz $1.12½
Hill's Tongs.....₩ doz $3.00
Hill's Rings.....₩ dos bxs $1.00
Perfect Rings.....₩ dos bxs $1.50
Perfect Ringers.....₩ doz $2.15@$2.25
Blair's Hog Ringers.....₩ doz $2.00
Blair's Hog Rings.....₩ doz 20¢@$1.00
Champion Ringers.....₩ doz $2.00
Champion Rings, Double.....₩ doz $2.25
Brown's Ringers.....₩ doz $2.00
Brown's Rings.....₩ dos $1.15@1.25
Electric Hog Rings .....₩ doz boxes $1.50
Electric Hog Ringers .....₩ doz $2.00

Rivets and Burrs—
Iron, list Nov. 17, '87.....40%
Copper.....60&10@60&10&5%
Coppered Iron, Bettina Brand.....40%

Rivet Sets—See Sets.

Rods—
Stair, Brass .....25&2%
Stair, Black Walnut .....₩ doz 40¢

Rollers—
Barn Door, Sargent's list .....60&10&10%
Acme Moore's Anti-Friction.....55%
Union Barn Door Roller 70%

Rope.
Manila...¼ in. and larger .....₩ ℔ 11 ¢
Manila.....⅜ in. ₩ ℔ 11½¢
Manila.....¼ and 5-16 in. ₩ ℔ 12 ¢
Manila Tarred Rope.....₩ ℔ 10½¢
Manila, Hay Rope.....₩ ℔ 11 ¢
Sisal.....½ inch and larger ₩ ℔ 7½¢
Sisal .....⅜ in. ₩ ℔ 8½¢
Sisal.....¼ and 5-16 in. ₩ ℔ 8½¢
Sisal, Hay Rope.....₩ ℔ 7½¢
Sisal, Tarred Rope.....₩ ℔ 7½¢
Sisal, Medium Lathe Yarn.....₩ ℔ 6½¢
New Zealand..½ in. and larger ₩ ℔ 7½¢
New Zealand.....¾ inch, ₩ ℔ 7½¢
New Zealand, ¼ and 5-16 inch, ₩ ℔ 8½¢
New Zealand, Hay Rope.....₩ ℔ 7½¢
New Zealand, Tarred Rope....₩ ℔ 6½¢
Note.—Manufacturers' prices on above ½¢ ₩ ℔ less, f. o. b. factory.
Cotton Rope.....₩ ℔ 13½@16¢
Jute Rope.....₩ ℔ 6 @6½¢
Wire—
List May 1, 1886.
Iron.....32½&2½%
Iron, Galvanized.....40&2½%
Cast Steel.....40&2½%

Rules—
Boxwood.....80&10&10@80&10&10&10%
Ivory.....50@50&10%
Starrett's Rules and Straight Edges, Steel.....25&10%

Sad Irons—See Irons, Sad.

Sand and Emery Paper and Cloth—See Paper and Cloth, Sand and Emery

Sash Cord—See Cord, Sash.

Sash Locks—See Locks, Sash.

Sash Weights—See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.

Saws—The following prices are often cut by jobbers.
Disston's Circular .....45@45&5%
Disston's Cross Cuts .....45@45&5%
Disston's Hand .....20@20&5%
Woodrough & McFarlin,
Hand, Panel and Rip.....25@25&5%
Narrow Champion Cross Cuts with Handles, ₩ foot.....18@20¢
Champion Thin Back Cross Cuts, ₩ foot.....26@28¢
Champion Extra Thin Back Cross Cuts, ₩ foot.....29@31¢
One Man Champion Cross Cuts, ₩ foot.....37@40¢
Wheeler, Madden & Clemson Mfg. Co.
Hand, Panel and Rip.....26@28&5%
Narrow Champion Cross Cuts with Handles, ₩ foot.....18@20¢
Champion Thin Back Cross Cuts, ₩ foot.....26@28¢
Champion Extra Thin Back Cross Cuts, ₩ foot.....29@31¢
One Man Champion Cross Cuts, ₩ ft.. 37@40
Atkins' Circular Shingle and Heading dis 50%
Atkins' Silver Steel Diamond X Cuts ₩ foot 70¢
Atkins' Special Steel Dexter X Cuts ₩ foot 50¢
Atkins' Special Steel Diamond X Cuts ₩ foot 32¢
Atkins' Champion and Electric Tooth X Cuts.....₩ foot 30¢
Atkins' Hollow Back X Cuts. ₩ foot 20¢
Atkins' Mulay, Mill and Drag.....40%
Atkins' One-Man Saw, with handles, ₩ foot 40¢
Peace Circular and Mill.....45@45&5%
Peace Hand Panel and Rip....25@25&5%
Peace Cross Cuts.....45@45&5%
Richardson's Circular and Mill.45@45&5%
Richardson's X Cuts.....45@45&5%
Richardson's Hand, &c.....25@25&5%
C. E. Jennings & Co., Hand, Panel and Rip .....25@25&10%

Hack Saws—
Griffin's, complete.....40&10@50%
Griffin's Hack Saw, Blades....40&10@50%
Star Hack Saws and Blades.....35%
Eureka and Crescent.....25%

Scroll—
Lester, complete, $10.00.....25%
Rogers, complete, $4.00.....25%
Barnes' Builders' and Cab. Makers' $15.25%
Barnes' Scroll Saw Blades.....35%

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Scales—
Hatch, Counter, No. 171, good quality, ₩ doz $21.00
Hatch, Tea, No. 161....₩ doz $6.75@$7.00
Union Platform, Plain.....$2.10@2.20
Union Platform, Striped.....$2.40@2.50
Chatillon's Grocers' Trip Scales 50%
Chatillon's Eureka.....25%
Chatillon's Favorite.....40%
Family, Turnbulls.....30@30&10%
Riehle Bros.' Platform.....40%

Scale Beams—See Beams, Scale

Scissors, Fluting.....45%

Scrapers—
Adjustable Box Scraper (S. R. & L. Co.) $6.50.....30&10%
Box, 1 Handle.....₩ doz $4.00. 10%
Box, 2 Handle.....₩ doz $6.00. 10%
Defiance Box and Ship.....30&10%
Foot.....50&10@60%
Ship, Common .....₩ doz $3.50 net
Ship, R. I. Tool Co.....10%

Screen Window and Door Frames—See Frames.

Screw Drivers—See Drivers, Screw.

Screws.
Bench and Hand—
Bench, Iron.....55&10@55&10&10%
Bench, Wood, Beech.....₩ doz $2.25
Bench, Wood, Hickory.....20&10%
Hand, Wood.....25&10@25&10&5%
Hand, Grand Rapids, list.....55%
Lag, Blunt Point, list Jan. 1, 1890.75&10%
Coach and Lag, Gimlet Point, list Jan. 1, 1890.....75@75&10%
Bed.....25&5%
Hand Rail, Sargent's.....60&&10%
Hand Rail, H. & T. Mfg. Co...70&10@75%
Hand Rail, Am. Screw Co.....75%
Jack Screws, Millers Falls list..50@50&5%
Jack Screws, P. S. & W.....35%
Jack Screws, Sargent...60&10@60&10&5%
Jack Screws Stearns'.....40@40&10%

Cork—
Humason & Beckley Mfg. Co..40&10@50%
Williamson's.....33⅓@33⅓&5%
Howe Bros & Hulbert.....35%

Machine—
Flat Head, Iron.....55%
Round Head, Iron 50%

Wood—
List January 1, 1891.
Flat Head Iron.....72½% } Extra 10 & 10&5 % off.
Round Head Iron.....67½% } Extra 10 & 10&5 % off.
Flat Head Brass.....72½% } Extra 10 & 10&5 % off.
Round Head Brass.....65 % } Extra 10 & 10&5 % off.
Flat Head Bronze.....72½% } Extra 10 & 10&5 % off.
Round Head Bronze.....65 % } Extra 10 & 10&5 % off.
Rogers' Drive Screws.....83⅓% } Extra 10 & 10&5 % off.

Scroll Saws—See Saws, Scroll.

Scythes.
Grain.....40&5@40&10%
Grass.....40@10@50%

Scythe Snaths—See Snaths, Scythe

Sets.
Awl and Tool.
Aiken's Sets, Awls and Tools, No. 20, ₩ doz $10.00.....55&10%
Fray's Adj. Tool Hdls., Nos. 1, $12; 2, $18; 3, $12; 4, $9.....25@25&10%
Miller's Falls Adj. Tool Hdls., Nos. 1, $12; 2, $18.....25%
Henry's Combination Haft...₩ doz $6.50
Stanley's Excelsior: No. 1, $7.50; No. 2, $4.00; No. 3, $5.50.....30&10%
Common Brad Sets, No. 42, $10.50; No. 43, $12.50..70&10&5%

Nail—
Square.....₩ gr., $4 00@$4.25
Round.....₩ gr. $3.25
Buck Bros.....27½%
Cannon's Diamond Point..₩ gr.,$12, 20%

Rivet.
Regular list.....50&10%

Saw—
Stillman's Genuine...₩ doz $5.00@7.75,
Stillman's Pattern Hand, ₩ doz $3.25; Cross Cut, 5.25.....45@50%
Common Lever .....₩ doz $2.00, 45@50%
Merrill's No. 1, $15.00; Nos. 3&4, $24.00. 40&10@50%
Leach's. .No. 0, $8.00; No. 1, $15, 15@20%
Nash's .....60&10@20&10&10
Hammer, Hotchkiss.....$5.50, 10%
Hammer, Bemis & Call Co.'s new Pat. 30&5%
Bemis & Call Co.'s Lever and Spring Hammer.....30&5%
Bemis & Call Co.'s Plate.....10%
Bemis & Call Co.'s Cross Cut 12½%
Aiken's Genuine.....$13.00, 50&10@60%
Aiken's Imitation.....$7.00, 55&5%
Hart's Pat. Lever.....20%
Disston's Star. 25%
Leopold.....40&10@50%
Atkin's Lever.....₩ doz No. 1, $6.00
Atkin's Criterion.....₩ doz No. 1, $6.00
Croissant (Keller), No. 1, $15.00; No. 2, $24.00.....40&10%
Avery's Saw Set and Punch.....50%
Chieftain Co.'s Superior.....₩ doz $7.00
Chieftain Co.'s Royal.....₩ doz $7.50
Crescent.....₩ doz $3.00

Sharpeners, Knife.
Parkins.
Applewood Handles....₩ doz $6.00, 40%
Rosewood or Cocobola.₩ doz $900 40%

Shaves, Spoke
Iron.....45%
Wood.....30%
Bailey's (Stanley R. & L. Co.).....40&10%
Stearns'.....30&10%
Cincinnati.....35&10%
Goodell's, ₩ doz $9.00.....25%

Shears—
American (Cast) Iron...75&10@75&10&5%
Barnard's Lamp Trimmers...₩ doz $3.75
Tinners'.....20&2%
Seymour's, List, Dec., 1881. 60&10&10@60&10&10&5%
Heinisch's, List, Dec., 1881. 60&10&10@60&10&10&5%
Heinisch's Tailor's Shears.....33⅓%
Cast Steel Trimmers:
First quality .....50@50&10%
Second quality.....50&10@50&10&10%
Acme Cast Shears.....10&10%
Diamond Cast Shears.....10%
Clipper.....10&10%
Victor Cast Shears.....75&10@75&10&5%
Howe Bros. & Hulbert, Solid Forged Steel.....40%
Chicago Drop Forge & F. Co., Solid Steel Forged.....60%
Davenport Cutlery Co.....60@60&10%
Clauss Shear Co., Japanned.....70%
Clauss Shear Co., Nickeled, same list.60%
Galvanic, 3½ to 9 in, ₩ doz, $1.00 ₩ inch

Pruning Shears and Hooks.
Disston's Combined Pruning Hook and Saw.....₩ doz $18.00, 20&10%
Disston's Pruning Hook, ₩ doz $12.00, 20&10%
E. S. Lee & Co.'s Pruning Tools.....40%
Pruning Shears, Henry's Pat, ₩ doz $3.75@4.00
Henry's Pruning Shears, ₩ doz $4.25@4.50
Wheeler, M. & C. Co.'s Combination, ₩ doz $12.00, 20%
Dunlap's Saw and Chisel, ₩ doz $8.50, 30%
J. Mallinson & Co., No. 1, $5.25; No. 2 7.25
P., S. & W. Co.....60%

Tinners', &c.—
Shears and Snips (P. S. & W.).....20@25%
Snips, J. Mallinson & Co.....33⅓%

Sheaves—
Sliding Door—
M. W. Co., list July, 1888..50&10@60&5%
R. & E., list Dec. 15, 1885.....55&20%
Corbin's list.....60&10&2%
Patent Roller.....60&10&2%
Patent Roller, Hatfield's.....75%
Russell's Anti-Friction, list Dec. 18, 1885.....60&2%
Moore's Anti-Friction.....50%

Sliding Shutter—
R. & E. list Dec. 18, 1885.....60&10&2%
Sargent's list.....60&10%
Reading list.....60&10&10%

Shells—
First quality 4, 8, 10 and 12 gauge 25&10&2%
First quality, 14, 16 and 20 gauge ($10 list).....30&10&2%
Prize.....40&2%
Star, Club, Rival and Climax brands, 33⅓&10&2%
Selbold's Comb. Shot Shells.....15&2%
Brass Shot Shells, 1st quality.....60&10&2%
Brass Shot Shells, Club, Rival, Climax.. 65&2%

Shells Loaded—
Standard List, July 19, 1890..... 40&10&10@40&10&10&5%

Ship Tools—
L. & I. J. White.....20&5%

Shoes, Horse, Mule, &c.—
Horse—
Burden's, Perkins', Phœnix and Bryden's Boss, at factory. $4.00
Bryden's Frog Pressure, at factory $5.00
Mule—
Add $1 ₩ keg to above prices.
Oz, Wrought—
Ton lots.....₩ ℔ 9¢
1000 ℔ lots.....₩ ℔ 9½¢
500 ℔ lots.....₩ ℔ 10¢

Shot—

	Ton lots	Small lots
Drop, up to B, 25-℔ bag	$1.42	$1.47
Drop, no to B, 5-℔ bag	.35	.36
Drop, B and larger, 25-₩ bag	1.67	1.72
Drop, B and larger 5-℔ bag	.40	.41
Buck and Chilled, 25-℔ bag	1.67	1.72
Buck and Chilled, 5-℔ bag	.40	.41
Dust Shot, 25-℔ bag	2.00	2.05
Dust Shot, 5-℔ bag	.45	.46

Shovels and Spades—
Ames' Shovels, Spades, &c., list Nov. 1, 1885.....20%
NOTE.—Jobbers frequently give 5@7½% extra on above.
Griffith's Black Iron.....50&10%
Griffith's C. S.....60@60&10%
Griffith's Solid C. S. R. R. Goods.....20%
St. Louis Shovel Co.....20@20&7½%
Hussey, Binns & Co.....15@25%
Hubbard & Co.....20@20&7½%
Lehigh Mfg. Co.....50&10%
H. M. Myers Co.....30%
Payne Pettebone & Son.....33⅓&25%
Remington's (Lowman's Pat.)60&10&40%
Rowland's, Black Iron.....50&10%
Rowland's Steel.....60&5@60&10%

Shovels and Tongs—
Iron Head.....60&10@60&10&5%
Brass Head.....60&10&10%

Sieves—
Mann's Tin Rim.....50&25%
Buffalo Metallic, S. S. & Co.....50&25%
Shaker (Barler's Pat.) Flour Sifters.... ₩ doz $2.00; ₩ gr $21.60
Electric.....₩ gr $21.00
A. & W. Sifters.....₩ doz 2.00
Hunter's.....₩ doz $2.00
Smith's Adjustable Sifters ...₩ doz $2.00
Smith's Adjustable Milk Strainer. ₩ doz $2.00
Smith's Adjustable T. & C. Strainer. ₩ doz. $1.25

Sieves, Wooden Rim—

	Iron.	Plated.
Mesh 18, Nested, ₩ doz..	80¢	$1.00
Mesh 20, Nested, ₩ doz..	95¢	1.10
Mesh 24, Nested, ₩ doz..	$1.15	1.35

Skeins, Thimble—
Western list.....75&5@75&10%
Columbus Wrt. Steel. Special net prices
Coldbrookdale Iron Co.....60%
Seneca Falls Pattern.....60%
Utica P. S. T. Skeins.....60%
Utica Turned and Fitted.....35%

Slates—
School, by case.....50&10@50&10&10%

Snaps, Harness, &c.—
Anchor (T. & S. Mfg. Co.).....65%
Fitch's (Bristol).....50&10%
Hotchkiss.....10%
Andrews.....50%
Sargent's Patent Guarded.....70&10&10%
German, new list.....40&10%
Covert.....50&10&5&2%
Covert, New Patent.....50&10&5&2%
Covert, New R. E.....60&10&5&2%
Covered Spring.....60&10&10%
E. Covert's Triumph.....40%

Snaths, Scythe.
List.....50%

Soldering Irons—See Irons, Soldering.

Spittoons, Cuspidors, &c.
Standard Fiberware—
Cuspidors, 8¼-inch, ₩ doz., No. 5, $8; No. 5X $9.
Spittoons, Daisy, 8-inch, No. 1, $4; 10 and 11 inch, $6.

Spoke Shaves—See Shaves, Spoke.

Spoke Trimmers—See Trimmers, Spoke.

Spoons and Forks—
Tinned Iron—
Basting, Cen. Stamp, Co.'s list....70&10%
Solid Table and Tea, Cen. Stamp, Co.'s list.....70&10%
Buffalo S. S. & Co... .....33⅓&2%
Silver-Plated—(4 mos. or 5% cash 30 days).
Meriden Brit. Co., Rogers.....40&15%
C. Rogers & Bros.....40&15%
Rogers & Bro.....40&15%
Reed & Barton.....40@40&5%
Wm. Rogers Mfg. Co.....40, 15&5%
Simpson, Hall, Miller & Co.....40, 15&5%
Holmes & Edwards Silver Co....40, 15&5%
L. Boardman & Son..... .....50&12½%
Miscellaneous.
Holmes & Edwards Silver Co.:
No. 67 Mexican Silver.....50&10&5%
No. 30 Silver Metal.....50&10&5%
No. 24 German Silver.....50&10&5%
No. 50 Nickel Silver.....50&5%
No. 49 Nickel Silver.....50&10&5%
Wm. Rogers Mfg. Co.
Rogers' Silver Metal.....50, 10&5%
18% Rogers' German Silver.....60&5%
22% Rogers' Nickel Silver. .....50&5%
German Silver.....50@50&5
German Silver, Hall & Elton..50&5% cash
Nickel Silver.....50&5@50&10&5% cash
Britannia.....60@60&5%
Boardman's N'ck'l Silver, list July 1, 1891.....60½&5 % cash
Boardman's Britannia Spoons, case lots.....60&5% cash

Springs—
Door.—
Torrey's Rod, 39 in.....₩ doz $1.20@1.25
Gray's, ₩ gr., $20.00.....25%
Bee Rod ₩ gr., $90.00.....20@25%
Warner's No. 1, ₩ doz, $2.50; No. 2, $3.30.....50@50&5%
Gem (Coil), list April 19, 1886.....10@15%
Star (Coil), list April 19, 1886...20@2& &5%
Victor (Coil).....60&10@60&10&5%
Champion (Coil).....60&10@60&10&10%
Cowell's....No. 1, ₩ doz, $18.00; No. 2, $15.00.....50@50&10%
Rubber, complete, ₩ doz, $4.50...55&10%
Hercules.....50@50&10%
Carriage, Wagon, &c.—
Elliptic, Concord, Platform and Bait Scroll.....60&10&10%
Cliff's Bolster Springs.....25%

Squares—
Steel and Iron..... } .80&10@80&10&10%
Nickel-Plated..... }
Try Square and T Bevels...60&10@60&10&10&5%
Disston's Try Square and T Bevels.....50%
Winterbottom's Try and Miter....30&10%
Starrett's Micrometer Caliper Squares. 25%
Avery's Flush Bevel Squares.....40%
Avery's Bevel Protractor 50%

Squeezers.
Fodder.—
Blair's.....₩ doz $2.00
Blair's "Climax".....₩ doz $1.25
Lemon—
Porcelain Lined, No. 1....₩ doz $6.00, 25&20%
Wood, No. 2.....₩ doz $3.00, 35%
Wood, Common.....₩ doz $1.70@1.75
Dunlap's Improved .....₩ doz $3.75, 20%
Sammis....No. 1, $6.00; No. 2, $9; 12, $18 ₩ doz.....35&10%
Jennings' Star.....₩ doz $2.50
The Boss.....₩ doz $2.50
Dean's..Nos. 1, ₩ doz $6.50; 2, $5.35; 3, $1.90; Queen, $2.50
Little Giant.....50@50&5%
King.....40&5%
Hotchkiss Straight Flash....₩ doz $12.00
Silver & Co., Glass.....₩ gro. $9.00
Manny Lemon Juice Extractor:
Standard.....₩ doz $0.75@$1.00
Improved.....₩ doz $4.00

Standard Fiber Ware—See Ware, Standard Fiber.

Staples.
Blind—
Barbed, ½ in. and larger.....₩ ℔ 7@7½¢
Barbed, ¼ in. .....₩ ℔ 8@8½¢
Fence staples, Galvanized. } Same price as B'rb'd Wire. See Trd. Rep.
Fence Staples, Plain. } Same price as B'rb'd Wire. See Trd. Rep.

Steelyards... .....40&10@50%

Stocks and Dies—
Blacksmith's
Waterford Goods.....40@40&10%
Butterfield's Goods.....40@40&10%
Lightning Screw Plate.....25@30%
Reece's New Screw Plates....33⅓&5@40%
Reversible Ratchet.....30
Gardner.....25%

Stops, Bench.
Morrill's.....₩ doz $9, 50%
Hotchkiss's.....₩ doz $5. 10@10&10%
Weston's, No. 1, $10; No. 2, $9.25&10&5%
McGill's.....₩ doz $3.....10%
Cincinnati.....25&10%
Terrell's Nos. 1 and 2, ₩ doz., $3; No. 3, $3.50.....30%

Stone—
Hindostan No. 1, 3¢; Axe, 3½¢; Slips No. 1, 4½¢
Sand Stone.....₩ ℔ 2½¢
Washita Stone, Extra.....₩ ℔ 22@23¢
Washita Stone, No. 1.....₩ ℔ 19@20¢
Washita Stone, No. 2.....₩ ℔ 12@13¢
Washita Slips, No. 1, Extra..₩ ℔ 44@46¢
Washita Slips, No. 1.....₩ ℔ 33@35¢
Arkansas Stone, No. 1, 4 to 6 in₩ ℔ $1.50
Arkansas Stone, No. 1, 6 to 9 in₩ ℔ $1.85
Turkey Oil Stone, 4 to 8 in.....₩ ℔ 40¢
Turkey Slips.....₩ ℔ $1.00@1.50
Lake Superior, Chase.....₩ ℔ 13¢
Lake Superior Slips, Chase.....₩ ℔ 20¢
Seneca Stone, Red Paper Brand.....₩ ℔ 15@20¢
Seneca Stone, High Rounds..₩ ℔ 20@25¢
Seneca Stone, Small Whets..₩ gro $24.00

Stove Polish—See Polish, Stove.

Stretchers, Carpet.
Cast Steel, Polished.....₩ doz $2.25
Cast Iron, Steel Points.....₩ doz 80¢
Socket.....₩ doz $1.75
Gullard's.....25@25&10%

Strops, Razor—
Genuine Emerson.....60@60&5%
Imitation " ....₩ doz $2.00, 20&10&5%
Torrey's.....20%
Badger's Belt and Com.....₩ doz $3.00
Lamont Combination.....₩ doz $4.00
Jordan's Pat. Padded, list Nov. 1, '89.50%
Electric.....List net

Stuffers or Fillers, Sausage—
Miles' "Challenge," ₩ doz $20, 50@50&5%
Perry .....₩ doz, No. 1, $16.00; No. 0, $21.00.....50@50&10%
Draw Cut No. 4, each $30.00.....20%
Enterprise Mfg. Co.....20&10@30%
Silver's.....40&10%

Sweepers, Carpet.
Bissell No. 5.....₩ doz $17.00
Bissell No. 7 New Drop Pan.₩ doz $19.00
Bissell, Grand.....₩ doz $36.00
Grand Rapids.....₩ doz $24.00
Crown Jewel, No. 1, $18.00; No. 2, $19.00; No. 3, $20.00.....₩ doz $15.00
Magic.....₩ doz $15.00
Jewel.....₩ doz $17.00
Improved Parlor Queen, Nickeled..₩ doz $27.00
Japanned.....₩ doz $24.00
Excelsior .....₩ doz $22.00
Garland .....₩ doz $18.00
Parlor Queen.....₩ doz $24.00
Housewife's Delight.....₩ doz $15.00
Queen.....₩ doz $16.00
Queen, with band.....₩ doz $18.00
King .....₩ doz $30.00
Weed, Improved.....₩ doz $18.00
Hub.....₩ doz $16.00
Cog-Wheel.....₩ doz $16.00
Easy .....₩ doz $22.00
Monarch.....₩ doz $22.00
Goshen.....₩ doz $21.00
Ladies' Friend.....₩ doz $15.00
Advance.....₩ doz $18.00
Supreme.....₩ doz $22.00

Tacks, Brads, &c.—

List October 19, 1889. Old established standard weights Short Weight goods are sold at lower prices.

Carpet Tacks—
American, Blued.....75 %
American, Tin'd and Cop'd.77½ %
Steel, Bright and Blued....72½ %
Steel, Tinned and Coppered 75 %
Swedes Iron, Blued. .....72½ %
Swedes Iron, Tinned.....75 %
American Iron Tacks.....72½ %
Swedes Iron Tacks—
S. S., Blued.....75 %
S. S., Tinned.....77½ %
Lanc., Blued.....66⅔ %
Lanc., Tinned.....72½ %
Gimp and Lace Tacks—
S. S., Blued .....75 %
S. S., Tinned.....77½ %
Lanc., Blued.....66⅔ %
Lanc., Tinned.....72½ %
Basket and Trimmers' Tacks—
Lanc .....65 %
S. S.....70 %
Hungarian Nails.....66⅔ %
Miners' Tacks, S. S.....75 %
Miners' Tacks, Lanc.....70 %
Common and Patent Brads..66⅔ %
Leathered Tacks.....20 %
Brush Tacks.....50 %
Looking Glass Tacks.....50 %
Picture-Frame Points.....50 %
Finishing Nails.....66⅔ %
Trunk and Clout Nails—
Black.....66⅔ %
Tinned or Coppered.....66⅔ %
Basket Nails .....62½ %
Chair Nails.....62½ %
Cigar-Box Nails .....50 %
Tin Capped Nails.....50 %

Regular discount 10&2 %, cash. 10@10&10 % is often given. On many of these goods extra

Miscellaneous—
D'ble-Point..120 count85&10@85&10&10%
Wire Carpet Nails. .....50&10%
Plymouth Rock Steel Carpet Tacks..25%
Wire Brads and Nails, see Nails, Wire.
Steel-Wire Brads, R. & E. Mfg. Co.'s list .....50&10%

Tapes, Measuring—
American.....40@40&5%
Spring.....40%
Chesterman's, Regular list.....25@30%

Thermometers—
Tin Case.....80@80&10%

Thimble Skeins—See Skeins.

Ties, Bale—See
Standard Wire, list.....50&10&5%

Tinners' Shears, &c.—See Shears Tinners'

Tinware—
Stamped, Japanned and Pieced, list Jan. 20 1887.....70&10@70&25%

Tire Benders, Upsetters, &c—
See Benders and Upsetters, Tire.

Tools.
Coopers'—
Bradley's.....20%
Barton's.....30@20&5%
L. & I. J. White.....20&5%
Albertson Mfg. Co.....25%
Beatty's.....30%
Sandusky Tool Co.....30@30&5%
Shaves, Cincinnati Tool Co.....20%
Lumber.
Ring Peavies, "Blue Line"...₩ doz $20.00
Ring Peavies, Common.....₩ doz $18.00
Steel Socket Peavies.....₩ doz $21.00
Mall. Iron Socket Peavies...₩ doz $19.00
Cant Hooks, "Blue Line"...₩ doz $16.00
Cant Hooks, Common Finish..₩ doz $14.00
Cant Hooks, Mall. Socket Clasp, "Blue Line" Finish.....$16.00
Cant Hooks, Mall. Socket Clasp, Common Finish.....₩ doz $14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish.....₩ doz $14.00
Cant Hooks, Clip Clasp, Common Finish.....₩ doz $12.00
Hand Spikes....₩ doz 6 ft., $15.00; 8 ft., $20.00
Pike Poles, Pike & Hook, ₩ doz., 12 ft., $11.50; 14 ft., $12.50; 16 ft., $14.50; 18 ft., $17.50; 20 ft., $21.50.
Pike Poles, Pike only, ₩ doz, 12 ft., $10.00; 14 ft., $11.00; 16 ft., $13.00; 18 ft., $16.00; 20 ft., $20.00.
Pike Poles, not ironed, ₩ doz, 12 ft. $8.00; 14 ft., $7.00; 16 ft., $9.00; 18 ft., $12.00; 20 ft., $16.00.
Setting Poles, ₩ doz, 12 ft., $14.00; 14 ft., $15.00; 16 ft., $17.00
Swamp Hooks.....₩ doz $18.00
Saw.
Atkins' Perfection.....₩ doz $12.00
Atkins' Excelsior.....₩ doz $6.00
Atkins' Giant.....₩ doz $4.00

Tobacco Cutters—See Cutters, Tobacco.

Transom Lifters — See Lifters, Transom.

Traps—
Game—
Newhouse.....40@40&5%
Oneida Pattern.....70&10%
Game, Blake's Patent.....40&10&5%
Mouse and Rat—
Mouse Wood, Choker, ₩ doz holes, 11@12¢
Mouse, Round Wire.....₩ doz $1.50 10%
Mouse, Cage, Wire.....₩ doz $2.50, 10%
Mouse, Catch-'em-alive....₩ ds $2.50' 15%
Mouse, Bonanza.....₩ doz $0.90@$1.00
Rat, Decoy.....₩ gr $10.00, 10%
Ideal.....₩ gr $10.00
Cyclone.....₩ gr $5.25
Hotchkiss Metallic Mouse, 5-hole traps, ₩ doz., 90¢; in full cases, ₩ doz.....75¢
Hotchkiss Imp. Rat Killer..₩ gro $18.50
Hotchkiss New Rat Killer...₩ gro $16.50
Schuyler's Rat Killer.....₩ gro $15.00

Triers—
Butter and cheese.....35%

Trimmers, Spoke.
Bonney's.....₩ doz $10.00, 50%
Stearns'.....20&10%
Ives', No. 1, $15.00; No. 2, $12.00 ₩ doz. 55&10%
Douglas'.....₩ doz $9.00, 20%
Cincinnati.....25%

Trowels—
Lothrop's Brick and Plastering, 20&10&5@35%
Reed's Brick and Plastering.....15%
Disston's Br'k and Plastering.....25%
Peace's Plastering.....25%
Clement & Maynard's.....20%
Rose's Brick.....15@20%
Brade's Brick.....25%
Worrall's Brick and Plastering.....20%
Garden.....70%

Trucks, Warehouse, &c.—
B. & L. Block Co.'s list, '82.....40%

Tubes, Boiler—
See Pipe.

Twine—

Flax Twine—	BC.	B.
No. 9, ¼ and ⅛ ℔ Balls	25¢	31¢
No. 12, ¼ and ⅛ ℔ Balls	22¢	30¢
No. 18, ¼ and ⅛ ℔ Balls	20¢	29¢
No. 24, ¼ and ⅛ ℔ Balls	20¢	29¢
No. 36, ¼ and ⅛ ℔ Balls	15¢	28¢
No. 264, Mattrass, ¼ and ⅛ ℔ Balls	52@54¢	
Chalk Line, Cotton, ⅛ ℔ Balls	25¢	
Mason Line, Linen, ⅛ ℔ Balls	55¢	
2-Ply Hemp, ¼ and ⅛ ℔ Balls (Spring Twine)	15½¢	
3-Ply Hemp, 1 ℔ Balls	16¢@16½¢	
3-Ply Hemp, 1½ ℔ Balls	15¢@15½¢	
Cotton Wrapping, 5 Balls to ℔	15¢@16¢	
2, 3, 4 and 5-Ply Jute, ⅛ ℔ Balls	10¢	
Wool	6½¢@8¾¢	
Paper	13¢@14¢	
Cotton Mops, 6, 9, 12 and 18 ℔ to doz.	18¢	

Vises—
Solid Box.....50&10@50&10&5%
Parallel—
Fisher & Norris Double Screw.....15&10%
Stephens'.....25@30%
Parker's.....20@25%
Wilson's.....55%
Howard's.....40%
Bonney's.....40&10%
Millers Falls.....40@40&10%
Trenton.....40&5@40&10%
Merrill's.....15@20%
Sargent's.....60&10&10%
Backus and Union.....40%
Double Screw Leg.....15&10%
Prentiss.....30@35%
Simpson's Adjustable.....40%
Moore's.....20%
Massey Quick Action.....20 @ 25 %
Saw Filers—
Bonney's, Nos. 2 & 3, $15.00.....40&10%
Stearn's.....33⅓&10@33⅓&10&10%
Stearn's Silent Saw Vises.....33⅓@35%
Sargent's.....60%&10%
Hopkins'.....₩ doz $17.50, 10%
Reading.....40&10%
Wentworth.....20&10%
Miscellaneous.
Combination Hand Vises.....₩ gr $42.00
Cowell Hand Vises.....20%
Bauer's Pipe Vises.....10%
Cincinnati.....25&10%
Enterprise Pipe Vises, each.....$3.00
Massey Combination Pipe.....40 %

Wads—Price per M.

J.M.C.&W.R.A.—B.E., 11 up...	68¢	Dis.50&2
J.M.C.&W.R.A.—B.E., 9&10...	82¢	
J.M.C.&W.R.A.—B.E., 8.....	96¢	
J.M.C.&W.R.A.—B.E., 7.....	$1.10	
U.M.C.&W.R.A.—P.E., 11 up..	1.15	
U.M.C.&W.R.A.—P.E., 9&10..	1.50	
U.M.C.&W.R.A.—P.E., 8.....	1.70	
U.M.C.&W.R.A.—P.E., 7.....	1.80	
Eley's B.E., 11 up.....	$1.70@$1.75	
Eley's P.E., 11@10.....	3.00@ 3.25	

Wagon Boxes—See Boxes, Wagon.

Washer Cutters—See Cutters Washer.

Wagon Jacks—See Jacks, Wagon.

Ware, Hollow, Enameled, &c.
Cast Iron, Hollow—
Stove Hollow-Ware—
Ground.....60&10%
Unground.....60&10&10%
White Enameled-Ware—
Maslin Kettles.....70&10@70&10&5%
Boilers and Saucepans.....50&10@60%
Tinned Boilers and S'pans....50&10@60%
Rustless Hollow-Ware.....50@50&5%
Gray Enameled-Ware—
Stove.....50%
Maslin Kettles.....60&10&10%
Boilers and Saucepans.....40&5%
Enameled—
Agate and Granite Ware, list Jan. 1, 1889.....33⅓&10%
Ironclad Enameled Ware...dis 33⅓&10%
Kettles—
Galvanized Tea-Kettles—

Inch....	6	7	8	9
Each....	55¢	60¢		75¢

Standard Fiber—

	Per Dozen. Plain.	Dec'r'd
Wash-Basins, 10½ in.....	$2.00	$2.25
Wash-Basins, 12 in.....	2.25	2.75
Keelers, 11½ in.....		4.00
Cuspidors.....		3.00
Spittoons, "Daisy," 8 in....	4.00	4.50
Peck Measure.....	4.00	
Half-peck Measure.....	3.50	

See also Pails.
Indurated Fiber—25%
Spittoons, No. 2, ₩ doz.....$8.40
Basins, Ringed, ₩ doz., No. 2.....$3.00
Washtubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), ₩ nest.....$7.50
Keelers Nested, Nos. 1, 2, 3 and 4 (4 pieces), ₩ nest.....$2.90
Butter Bowls 15, 17 and 19-inch (3 pieces), ₩ nest.....$1.70
Liquid Measures, pt., qt., 2 qt. and funnell (4 pieces) ₩ set.....$1.60
See also *Pails.*
Silver Plated, Hollow—
4 mo. or 5 % cash in 30 days.
Reed & Barton..... } 40&5%
Meriden Britannia Co..... }
Simpson, Hall, Miller & Co..... }
Rogers & Brother..... }
Hartford Silver Plate Co..... } 40&5&5%
William Rogers Mfg. Co..... }

Washers—

Size holes.....	5-16	¾	½	⅝ to 1¼
Washers.....	6	5	3.50@	3

In lots less than 200 ℔, ₩ ℔, add ½¢, 5-℔ boxes 1¢ to list.

Wedges—
Iron.....₩ ℔ 3½¢
Steel.....₩ ℔ 3½¢

Weights, Sash—
Solid Eyes.....₩ ton $18@$19

Well Buckets, Galvanized—See Buckets, Well, Galvanized.

Wheels, Well.
8 in., $2.25; 10 in., $2.70; 12 in., $3.2[illegible]

Wire and Wire Goods—
Iron—
Market,
Br. & Ann., Nos. 0 to 18.....77½%
Cop'd, Nos. 0 to 18.....75%
Galv., Nos. 0 to 18.....67½%
Tin'd, Tinned list Nos. 0 to 18.....67½%
Stone,
Br. and Ann'd, Nos. 16 to 18.....77½%
Bright and Ann'd, Nos. 19 to 26.....80%
Br. and Ann'd, Nos. 27 to 36.....82½%
Tinned.....
Tinned Broom Wire, 18 to 21, ₩ ℔.....5¢
Galvanized Fence, Nos. 8 and 9.....70%
Brass, list Jan. 15, 1884.....35%
Copper, list Jan. 15, 1884.....35%
Annealed Wire on Spools.....55%
Malin's Steel and Tin'd on Spools.....55%
Malin's Brass and Cop. on Spools.....45%
Tate's Spooled, Tinned and Annealed.55%
Tate's Spooled Cop. and Brass.....45%
Cast Steel Wire.....50%
Stubs' Steel Wire.....$6.00 to $, 30%
Steel Music Wire, 12 to 30...60@70@ ₩ ℔
Wire Clothes Lines, see Lines.
Wire Picture Cord see cord.
Bright Wire Goods—
Standard list.....80&10%
Wire Cloth and Netting.
Painted Screen Cloth, good quality ₩ 100 sq. ft., $1.40
Galvanized Wire Netting.....70&10@75%

Wire, Barb.—F.o.b. Cars. Dis. 3 % cash in 10 days.

	Painted.	Galvanized.
Pittsburgh and Cleveland.	$2.55	$3.05
Allentown, Cincinnati and Joliet.....	2.65	3.15
St. Louis.....	2.70	3.20
Keokuk.....	2.75	3.25
Lockport, Baker Perfect..	2.85	3.35
Lawrence and Omaha....	2.90	3.40
San Francisco.....	3.80	4.30

Wire Rope—See Rope, Wire.

Wrenches—
American Adjustable.....40%
Baxter's Adjustable "S".....40&10&50%
Baxter's Diagonal.....40&10&50%
Coes' Genuine.....50&10%
Coes' "Mechanics'".....50&10&10%
Girard Standard.....65&10%
Lamson & Sessions' Engineers'.....60&10%
Lamson & Sessions' Standard.....70&10%
P. S. & W. Agricultural.....
Girard Agricultural..... } 75&10@75
Lamson & Sessions' Agric'l.. } 10&5%
Bemis & Call's
Pat. Combination.....35%
Merrick's Pattern.....35%
Brigg's Pattern.....35%
Cylinder or Gas Pipe.....40&5%
No. 3 Pipe.....40&10%
Aiken's Pocket (Bright).....$6.00, 50&10%
The Favorite Pocket.....₩ doz $4.00, 40%
Webster's Pat. Combination.....35%
Boardman's.....30&10%
Always Ready.....25&5%
Alligator.....50%
Donohue's Engineer.....30&10%
Acme, Bright.....50&2%
Acme, Nickeled.....40&2%
Hercules.....70%
Walker's.....55&5%
Diamond Steel.....55&5%
Cincinnati Brace Wrenches.....25&10%
Tafts' Vise Wrench.....55&10&5%

Wringers, Clothes—
Am. Wringer Co.'s list, July 15, 91..2% cash
Colby Wringer Co., list Sept. 1, '91.2% cash

Wrought Goods—
Staples, Hooks, &c., list Jan. 12, 1886, 85@85&1[illegible]

PAINTS, OILS AND COLORS.—Wholesale Prices.

Animal and Vegetable Oils.

Linseed, City, raw..per gal.	37	@	..
Linseed, City, boiled.....	40	@	..
Linseed, Western, raw.....	35	@	36
Lard, City, Extra Winter..	56	@	..
Lard, City, Prime.....	53	@	54
Lard, City, Extra No. 1.....	42½@		45
Lard, City, No. 1.....	37½@		40
Lard, Western, prime.....	52	@	53
Cotton-seed, Crude, prime.	25	@	26
Cotton-seed, Crude, off grades.....	22	@	23
Cotton-seed, Summer Yellow, prime.....	30	@	31
Cotton-seed, Summer Yellow, off grades.....	28	@	29
Sperm, Crude.....	70	@	71
Sperm, Natural Spring.....	67	@	70
Sperm, Bleached Spring....	72	@	75
Sperm, Natural Winter.....	73	@	76
Sperm, Bleached Winter...	78	@	81
Whale, Crude.....	..	@	45
Whale, Natural Winter.....	54	@	56
Whale, Bleached Winter...	56	@	58
Whale, Extra Bleached.....	58	@	60
Sea Elephant, Bleached Winter.....	63	@	64
Menhaden, Crude, Sound..	30	@	32
Menhaden, Crude, Southern	..	@	..
Menhaden, Light Pressed..	37	@	38
Menhaden, Bleached W'ter.	38	@	40
Menhaden, Extra Bleached	40	@	42
Tallow, City, prime.....	43	@	44
Tallow, Western, prime....	42½@		..
Cocoanut, Ceylon.....	5½@		5¾
Cocoanut, Cochin.....	6¾@		7
Cod, Domestic	..	@	40
Cod, Foreign.....	..	@	..
Red Elaine.....	34	@	36
Red Saponified..... ₩ ℔	5	@	6¼
Bank.....per gal	35	@	36
Straits.....	36	@	37
Olive, Italian, bbls.....	62	@	65
Neatsfoot, prime.....	55	@	65
Palm, prime, Lagos....₩ ℔	6	@	6¼

Mineral Oils.

Black, 29 gravity, 25 @ 30 cold test.....per gal	7	@	7½
Black, 29 gravity, 15 cold test.....	8	@	8½
Black, 29 gravity, summer.	6	@	6½
Cylinder light, filtered.....	15	@	18
Cylinder, dark, filtered	12	@	15
Paraffine, 23½ @ 24 gravity.	13½@		14
Paraffine, 25 gravity.....	12½@		13
Paraffine, 28 gravity.....	8	@	8½
Paraffine, red, 21 @ 22 gr'ty	..	@	..
Paraffine, red, 23½@23 gr'ty	13	@	14

Paints and Colors.

Barytes, Foreign, ₩ ton.	$22.00	@	$24.00
Barytes, Amer. floated...	30.00	@	$32.00
Barytes, Amer. No. 1.....	19.00	@	$20.00
Barytes, Amer. No. 2.....	13.00	@	$16.00
Barytes, Amer., No. 3.....	11.00	@	$12.00
Blue, Celestial..... ₩ ℔	6	@	8
Blue, Chinese	50	@	55
Blue Prussian.....	25	@	40
Blue, Ultramarine	8	@	25
Brown, Spanish	½@		1
Brown, Vandyke, Amer..	3	@	3½
Brown, Vandyke, English	6	@	8
Carmine, No. 40, in bulk.	3.10	@	..
Carmine, No. 40, in boxes or barrels	3.20	@	..
Carmine, No. 40, in ounce bottles.....	4.20	@	..
Chalk, in bulk.... ₩ ton.	1.75	@	..
Chalk, in bbls.. ₩ 100 ℔.	83	@	40
China Clay, English.... ₩ ton.	13.00	@	18.00
Cobalt Oxide, prep'd....	2.90	@	....
Cobalt Oxide, black..... lots 100 ℔.	2.60	@	....
Cobalt, Oxide, black..... less 100 ℔	2.65	@	....
Green, Paris, in bulk.....	14	@	15½
Green Paris, 170 @ 175 ℔ kegs.....	14½@		15½
Green, Paris, small pack.	16	@	21½
Green, Chrome, ordinary	8	@	11
Green, Chrome, pure....	22	@	25
Lead, Eng., B.B. white....	8½@		10
Lead, Amn. White, dry or in oil: Kegs, lots less than 500 ℔....		@	7½
Kegs, lots 500 ℔ to 5 tons....		@	7
Kegs, lots 5 tons to 12 tons..		@	6¾
Kegs, lots 12 tons and over..		@	6½
Lead White in oil 25 ℔ tin pails add to keg price.....		@	½
Lead, White, in oil, 12½ ℔ tin pails, add to keg price....		@	1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price.		@	2½
Lead, Red, bbls. and ½ bbls....	6½	@	7½
Lead, Red, kegs.....	6¾	@	7¾
Litharge, kegs.....	6¾	@	7½
Litharge, bbls. and ½ bbls.....	6½	@	7¼

TERMS, &c.—Lead and Litharge.—On lots of 500 ℔ or over, 60 days' time or 2¼ % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.....	1.35	@	1½
Ocher, French Washed.....	1½@		2½
Ocher, German Washed....	1½@		2
Ocher, American.....	½@		1½
Orange Mineral, English...	9	@	9½
Orange Mineral, French....	10	@	10½
Orange Mineral, German ..	9½@		10
Orange Mineral, American..	8	@	8½
Paris White, English Cliffstone.....	1.00	@	1.15
Paris White, American.....	70	@	75
Red, Indian, English.....	6½@		7
Red, Indian, American....	2	@	6½
Red, Turkey.....	9	@	14
Red, Tuscan	9	@	11
Red, Venetian, American.. ₩ 100 ℔.	1.00	@	1.25
Red, Venetian, English....	1.00	@	1.50
Sienna, Italian, Burnt and Powd. ₩ ℔	5	@	6½
Sienna, Ital., Burnt Lumps	1½@		2½
Sienna, Ital., Raw, Powd..	5	@	6½
Sienna, Ital., Raw Lumps..	2	@	3½
Sienna, American, Raw....	1½@		1½
Sienna, American, Burnt and Powdered.....	1½@		1½
Talc, French.....	1½@		1½
Talc, American.....	1	@	1¼
Terra Alba, Fr'ch. ₩ 100 ℔	90	@	1.00
Terra Alba, English	50	@	60
Terra Alba, American No. 1	70	@	75
Terra Alba, American No. 2	40	@	50
Umber, Turkey, Bnt. and Powd..... ₩ ℔	3½@		4
Umber, Turkey Bnt. Ln	2½@		3
Umber, Turkey, Raw and Powdered.....	3½@		..
Umber, Turkey, R'w Lmps	2½@		2¾
Umber, Turkey, Bnt. Amer.	1½@		1¾
Umber, Turkey, R'w Amer.	1½@		1¾
Yellow, Chrome.....	10	@	25
Vermilion Americ. Lead..	11½@		17
Vermilion, Quicks'er, bulk.	64	@	66
Vermilion, Quicks'er, bags.	65	@	67
Vermilion Quicksilver, smaller pkgs.....	69	@	73
Vermilion English Import	80	@	85
Vermilion, Imitation, Eng.	8	@	25
Vermilion, Trieste.....	87½@		90
Vermilion, Chinese.....	90	@	95
Whiting, Common. ₩ 100 ℔	40	@	45
Whiting, Gilders'.....	50	@	55
Zinc, American, dry.... ₩ ℔	4½@		5
Zinc, French, Red Seal....	..	@	5½
Zinc, French, Green Seal..	..	@	8½
Zinc, French, V. M. X....	..	@	7
Zinc, Antwerp, Red Seal...	..	@	7½
Zinc, Antwerp, Green Seal	..	@	8½
Zinc, German, L. Z. O....	..	@	6¾
Zinc, V M. in Poppy Oil, Seal, lots of 1 ton and over.....	10½@		11¼
lots less than 1 ton	11	@	11¾
Zinc, V. M. in Poppy Oil, Red Seal.....	..	@	..
lots of 1 ton and over....	10	@	10¼
Lots of less than 1 ton....	10¼@		10¾

DISCOUNTS.—French Zinc.—Discounts to buyers of 10- bbl. lots of one or assorted grades, 1 %; 25 bbls, 2 %, 50 bbls, 4 %. No discount allowed on less than bbl. lots.

Colors in Oil.

Blue, Chinese..... ₩ ℔	35	@	40
Blue, Prussian.....	20	@	45
Blue, Ultramarine.....	12	@	18
Brown, Vandyke.....	7	@	12
Green, Chrome.....	8	@	13
Green, Paris.....	16	@	18½
Sienna, Raw.....	7	@	14
Sienna, Burnt.....	7	@	14
Umber Raw.....	7	@	10
Umber, Burnt	7	@	10

Putty.

In barrels and ½ bbls....	1.35	@	1.65
In tubs.....	.01½@		.01¾
In tin cans.....	.01½@		.02½
In bladders.....	.01½@		.02¾

Spirits Turpentine.

In regular bbls.....	33½@		..
In machine bbls.....	34	@	

Glue.

Low Grade..... ₩ ℔	8	@	10
Cabinet.....	12	@	14
Medium White.....	13	@	15
Extra White.....	17	@	20
French.....	19	@	22
English.....	10	@	15
Irish.....	12	@	..

CURRENT METAL PRICES.

DECEMBER 16, 1891.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
¾ to 2 in. round and square.. 1 to 6 in. x ⅜ to 1 in....	₩ lb 1.90 @ 2.00¢
Refined Iron:	
¾ to 2 in. round and square. 1 to 4 in. x ⅜ to 1½ in.... 4½ to 6 in. x ⅜ to 1 in.	₩ lb 2.00 @ 2.20¢
1 to 6 in. x ¼ and 5-16	₩ lb 2.20 @ 2.40¢
Rods—⅜ and 11-16 round and sq.	₩ lb 2.10 @ 2.30¢
Bands—1 to 6 x 3-16 to No. 12	₩ lb 2.30 @ 2.50¢
"Burden Best" Iron, base price.	₩ lb 3.00¢
Burden's "H. B. & S." Iron, base price	₩ lb 2.80¢
"Ulster"	₩ lb 3.00¢
Norway Bars	3.75 @ 4.00¢
Norway Shapes	4.50 @ 5.00¢

Merchant Steel from Store.

	Per pound
Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots	3¾¢
Best Cast Steel, base price in small lots	8 ¢
Best Cast Steel Machinery, base price in small lots	5 ¢

Sheet Iron from Store.

	Common American.	R. G.	Cleaned.
10 to 16	₩ lb 2.75 @ 3.00¢	3.35 @	¢
17 to 20	₩ lb 3.00 @ 3.25¢	3.35 @ 3.75	¢
21 to 24	₩ lb 3.35 @ 3.35¢	3.60 @	¢
25 and 26	₩ lb 3.35 @	3.60 @	¢
27	₩ lb 3 50 @ 3.62½¢	3.85 @	¢
28	₩ lb 3.65 @ ¢	4.10 @	¢
	B. B.		2d qual.
Galv'd, 14 to 20,	₩ lb, 4.75 @	4.60 @	¢
Galv'd, 21 to 24,	₩ lb, 5.12 @	5.00 @	¢
Galv'd, 25 to 26,	₩ lb, 5.50 @	5.35 @	¢
Galv'd, 27	₩ lb, 5.90 @	5.70 @	¢
Galv'd, 28	₩ lb, 6.25 @	6.10 @	¢
Patent Planished	₩ lb A 10¢	B, 9¢	
Russia	₩ lb 10½¢ @ 11¢		
American Cold Rolled B. B.	₩ lb 5¢ @ 7¢		
Craig Polished Sheet Steel	₩ lb, 8½¢		

English Steel from Store.

Best Cast	₩ lb 15 ¢
Extra Cast	₩ lb 16½ @ 17 ¢
Swaged. Cast	₩ lb 16 ¢
Best Double Shear	₩ lb 15 ¢
Blister, 1st quality	₩ lb 12 ¢
German Steel, Best	₩ lb 10 ¢
2d quality	₩ lb 9 ¢
3d quality	₩ lb 8 ¢
Sheet Cast Steel, 1st quality	₩ lb 15 ¢
2d quality	₩ lb 14 ¢
3d quality	₩ lb 12½¢
R. Mushet's "Special"	₩ lb 48 ¢
" " "Titanic"	₩ lb 20 ¢

METALS.

Tin.

	Per lb
Banca, Pigs	22 ¢
Straits, Pigs	22 ¢
Straits in Bars	24 ¢

Tin Plates.

Charcoal Plates.—Bright. Per box.

Melyn Grade	IC,	10 x 14	@	$6.75
" "	IC,	12 x 12	@	7.00
" "	IC,	14 x 20	@	6.75
" "	IC,	20 x 28	@	13.70
" "	IX,	10 x 14	@	8.25
" "	IX,	12 x 12	@	8.50
" "	IX,	14 x 20	@	8.25
" "	IX,	20 x 28	@	16.50
" "	DC,	12½ x 17	@	6.25
" "	DX,	12½ x 17	@	7.75
Calland Grade	IC,	10 x 14	@	6.70
" "	IC,	12 x 12	@	6.95
" "	IC,	14 x 20	@	6.60
" "	IX,	10 x 14	@	7.85
" "	IX,	12 x 12	@	8.20
" "	IX,	14 x 20	@	7.85
Allaway Grade	IC,	10 x 14	@	6.35
" "	IC,	12 x 12	@	6.50
" "	IC,	14 x 20	@	6.35
" "	IC,	20 x 28	@	12.40
" "	IX,	10 x 14	@	7.50
" "	IX,	12 x 12	@	7.80
" "	IX,	14 x 20	@	7.50
" "	IX,	20 x 28	@	15.00
" "	DC,	12½ x 17	@	6.80
" "	DX,	12½ x 17 .. 6.00	@	7.00

Coke Plates.—Bright.

Steel Coke.	IC,	10 x 14, 14 x 20	@	$5.70
		10 x 20	@	8.10
		20 x 28	@	11.70
	IX,	10 x 14, 14 x 20	@	6.60
BV. Grade.	IC,	10 x 14, 14 x 20	@	5.70

Charcoal Plates.—Terne.

Dean Grade.	IC,	14 x 20	@	$5.75
		20 x 28	@	10.75
	IX,	14 x 20	@	6.87½
		20 x 28	@	12.78
Abecarne Grade.	IC,	14 x 20	@	5 50
		20 x 28	@	10 75
	IX	14 x 20	@	6 50
		20 x 28	@	12 60

Tin Boiler Plates.

IXX, 14 x 28	112 sheets	@ $13.50
IXX, 14 x 28	112 sheets	@ 13.75
IXX, 14 x 31	112 sheets	@ 15.25

Copper.

Duty: Pig, Bar and Ingot, 1½¢; Old Copper, 1¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 35 % ad valorem.

Ingot

Lake	@ 11½¢
Ansonia Grade Arizona	@ 11½¢
Ansonia Grade Casting	@ 11 ¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 5, 1890. Subject to a discount of 10 % @ 20 %, according to size of order.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound. Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72		22	22	22	23	24	25	28	30
30		72	22	22	22	23	25	27	31	....
36	96		22	22	22	24	26	30	33	....
36		96	22	22	23	25	27	31	35	....
48	96		22	22	24	26	28	32	....	....
48		96	22	24	25	27	29	33	....	....
60	96		22	22	27	29	34	....	....	....
60		96	22	23	28	....	....	....	....	....
84	96		23	24	....	....	....	....	....	....
84		96	24	25	....	....	....	....	....	....
Over 84 in. wide			25	27	....	....	....	....	....	....

	16 oz.	14 oz.	12 oz.	10 oz.
All Bath Tub Sheets				
Per pound	$0.27	0.29	0.31	0.35

Bolt Copper, ⅝ inch diameter and over, per pound 22¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Copper Bottoms, Pits and Flats.

	Per pound
14 ounce to square foot and heavier	26¢
12 ounce and up to 14 ounce to square foot	27¢
10 ounce and up to 12 ounce	29¢
Lighter than 10 ounce	32¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

— % discount.

Tinning.

Net.

Tinning sheets on one side, 10, 12 and 14 x 48 each	8¢
Tinning sheets on one side, 30 x 60 each	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each	12¢
Tinning sheets on one side, other sizes, per square foot	2½¢
For tinning both sides double the above prices.	

Planished Brass and Copper.

Not larger than 30 x 60.

16 oz. and heavier	24¢ ₩ lb
14 oz.	25¢ ₩ lb
12 oz.	27¢ ₩ lb

Seamless Brass and Copper Tubes.

Net.

Sept. 16, 1891.

O. G.	N. G.	⅜	⅓	¼	⅝	½	⅝	¾	1	1¼
8-14	6-12	35	31	28	27	26	25	22		
15	13	36	31	29	28	27	26	24		
16	14	37	32	30	29	28	27	23		
17	15	38	33	31	28	29	28	24		
18	16	40	34	32	30	29	28	25		
19	17	41	35	33	32	31	30	27		
20	18-19	42	37	35	34	33	32	29		
21	20	44	39	37	36	35	34	32		
22	21	46	40	39	37	36	35	34		
23	22	48	42	40	39	38	37	37		
24	23	51	44	42	41	39	38	39		
25	24	54	47	44	43	42	41	43		

Copper Bronze and Gilding Tube, 8¢ ₩ lb additional.

Brazed Brass Tubing. (To No. 20, inclusive.

Above 5-16 inch to 3 inch, inclusive	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 5-16 inch	$1.00
Plain, ½ inch	1.50
Fancy Tubing, Brass, to No. 20, inclusive	43¢ ₩ lb
Bronze Tubing, 8¢ ₩ lb more than Brass.	
Discount from list	30 @ ..%

Roll and Sheet Brass.

(Brown & Sharpe Standard Gauge.)

Common High Brass: Wider than and including	in. 2 / 10	in. 10 / 12	in. 12 / 14	in. 14 / 16	in. 16 / 18	in. 18 / 20	in. 20 / 22	in. 22 / 24
To No. 20, inclusive	.21	.22	.23	.25	.27	.29	.31	.33
Nos. 21, 22, 23 and 24	.22	.23	.24	.26	.28	.30	.32	.34
Nos. 25 and 26	.22½	.23¾	.24½	.27	.29	.31	.33	.35
Nos. 27 and 28	.23	.24	.25	.28	.30	.32	.34	.36

Common High Brass: Wider than and including	in. 24 / 26	in. 26 / 28	in. 28 / 30	in. 30 / 32	in. 32 / 34	in. 34 / 36	in. 36 / 38	in. 38 / 40
To No. 20, inclusive	.36	.39	.42	.46	.50	.55	.60	.65
Nos. 21, 22, 23 and 24	.37	.40	.43	.47	.51	.56	.61	.66
Nos. 25 and 26	.38	.41	.44	.48	.52	.57	.63	.71
Nos. 27 and 28	.39	.42	.45	.49	.53	.58	.65	.75

Discount from List 10 % to 25 %.

Brass and Copper Wire.

List January 17, 1884.

Numbered by Stubs' gauge.	Soft & hard high brass.	Spring high brass.	Low brass.	Copper.
All Nos. to No. 16, inclusive	$0.22	$0.24	$0.26	$0.30
No. 17 and No. 18	.23	.25	.27	.31
No. 19 " " 20	.24	.26	.28	.32
No. 21, or 0.032 diam	.25	.27	.29	.33

Discount 10 % to 25 %.

Fine Numbers.

Numbered by London gauge.	Brass.	Spring high brass.	Low brass.	Copper.
No. 22	$0.26	$0.28	$0.30	$0.34
No. 23	.28	.30	.32	.36
No. 24	.30	.32	.34	.38
No. 25	.32	.34	.36	.40
No. 26	.35	.37	.39	.43
No. 27	.38	.40	.42	.46
No. 28	.42	.44	.46	.51
No. 29	.45	.47	.49	.54
No. 30	.48	.50	.52	.62
No. 31	.51	.53	.55	.67
No. 32	.55	.57	.59	.73
No. 33	.59	.61	.63	.82
No. 34	.64	.66	.68	.95
No. 35	.70	.72	.74	1.30
No. 36	.76	.78	.80	1.50
No. 37	1.00	1.02	1.04	1.70
No. 38	1.30	1.32	1.34	2.00
No. 39	2.00	2.02	2.00	3.25
No. 40	2.60	2.62	2.60	5.75

— % discount.

Spring Wire, 2¢ ₩ lb advance.

Copper Belt and Hose Rivets and Burrs.

	Per lb.		Per lb.
No. 5	49¢	No. 11	56¢
No. 6	49¢	No. 12	58¢
No. 7	49¢	No. 13	60¢
No. 8	50¢	No. 14	65¢
No. 9	52¢	No. 15	70¢
No. 10	54¢		

60 % @ 10 % discount.

Tobin Bronze—Rods.

¼ inch and larger 17¢ ₩ lb, net

Tobin Bronze—Piston Rods.

1½ inch and smaller	18¢ ₩ lb, net
Over 1½ inch	20¢ ₩ lb, net

Spelter.

Duty: Pig, Bars and Plates, $1.50 ₩ 100 lb.

Western Spelter	6¢
Bertha (pure)	8¾¢ @ 9 ¢

Zinc.

Duty: Sheet, 2½¢ ₩ lb.

600 lb casks	7¼¢
Per lb	7¾¢

Lead.

Duty: Pig, $2 ₩ 100 lb. Old Lead, 2¢ ₩ lb. Pipe and Sheets, 2½¢ ₩ lb.

American	4¾¢
Bar	5¼¢
Pipe, subject to trade discount	6¼¢
Tin-Lined Pipe, subject to trade discount	10¢
Block Tin Pipes, subject to trade discount	37½¢
Sheet, subject to trade discount	7¾¢

Solder.

½ @ ½ (Guaranteed)	14½¢
No. 1	12¢
Extra Wiping	11¾¢ @ 13¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson	₩ lb 16 @ 1 6½¢
Hallett's	" @ 13¾¢

ALUMINUM.

Prices Per Ton.

Over 98 % pure	₩ lb .75
94 % @ 98 % pure	₩ lb .65

Old Metals.

Prices Paid in New York.

Heavy Copper	₩ lb 10 ¢
Light Copper	₩ lb 9 ¢
Heavy Brass	₩ lb 7 ¢
Light Brass	₩ lb 6 ¢
Lead	₩ lb 3½¢
Tea Lead	₩ lb 3¾¢
Zinc	₩ lb 2¾¢
No. 1 Pewter	₩ lb 14 ¢
No. 2 Pewter	₩ lb 7 ¢
Wrought Scrap Iron	₩ gross ton $17.00
Heavy Cast Scrap	₩ gross ton 10.00
Stove Plate Scrap	₩ gross ton 7.00
Burnt Iron	₩ gross ton 5.00